

Flight, October 7, 1911.

FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

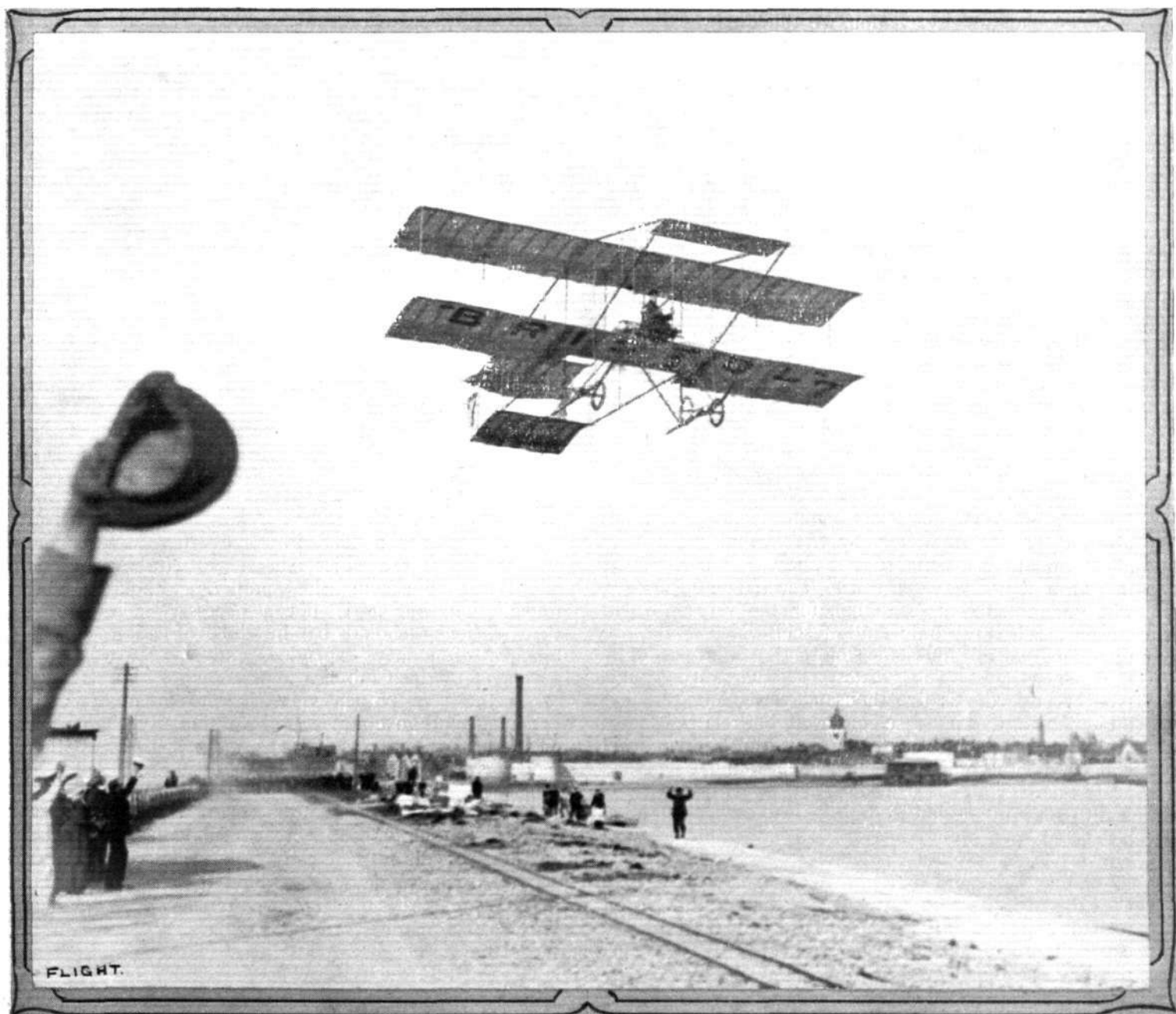
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OVER PORTSMOUTH BY AEROPLANE.—The somewhat suggestive photograph of a trip taken some little time ago by Mr. Graham Gilmour on a Bristol biplane, after having "shelled" Fort Blockhouse, when flying to Portsmouth a few days before. In our picture Mr. Gilmour is seen flying from the Haslar sea wall—a difficult rising ground by reason of the telegraph wires and other obstructions on the ground—out to sea on his way to Brighton.

EDITORIAL COMMENT.

The Aeroplane in War.

The unfortunate outbreak of war between Turkey and Italy and the news that the latter is to make the first practical test of the aeroplane in connection with the operations in Tripoli—assuming that serious military operations really take place in that part of the world—will focus the attention of all who are interested in military aviation on the problems connected with the use of aerial craft in war. The letters which have appeared in our correspondence columns on this subject during the past few months have treated the subject somewhat exhaustively, albeit somewhat too much from the one point of view. Most of our correspondents appear to have taken the line that one of the main uses to which the aeroplane will be put is that of a bomb-carrying and bomb-dropping machine, but, while we hasten to avow that we do not claim any expert knowledge of military aviation, we think they are wrong in such a conclusion. To say the very least, so far as the light of our present knowledge enables us to see, the use of the aeroplane for that purpose would be a simple waste of powers that could be more usefully employed in another direction. No doubt the moral effect of explosives dropped into an enemy's camp or fortress or among troops in close formation would count for something, even if the material damage were slight, but there are considerations to be taken into account which may well lead us to question whether the game would be worth the candle. First, there is at present the difficulty of hitting the target from a rapidly-moving aeroplane at even a low elevation, a difficulty which increases materially as the height is greater. While we have been improving the aeroplane, the artillerist has not been standing still, and gun mountings have been devised which enable weapons to throw their projectiles almost vertically. So long as the aeroplane had only to reckon on being opposed by field guns with a capacity for elevation of no more than twenty degrees, the danger from gun-fire even at heights which made successful bomb-dropping possible, was practically negligible, but all that has been altered by the evolution of high-angle mountings for the special purpose of meeting the new form of attack from the air. The anti-aeroplane gun will undoubtedly fire shrapnel, for the very sufficient reason that it is the only kind of shell which would give the gunner an earthly chance of scoring a hit except by the merest luck. The greatest effective range of this type of projectile is five thousand yards, owing to the limitations of the time-fuse employed, but relatively short as is the range at which shrapnel can be employed compared with common shell—which would be useless against aerial craft—it is evident that an aeroplane which had to get into position to drop its load of explosives on a selected spot, must come a long way inside effective range. True, the gunner is handicapped by the difficulty of finding range and speed of the aeroplane, but even then the odds are that it would be brought down before it had time to do any material damage worth the expenditure of a man and a machine capable of rendering possibly inestimable service to his commander as an observer.

Nor must the danger from hostile air-craft be lost sight of, for when two civilised armies meet in the future it must be assumed that each is likely to be as well off in the matter of material as the other.

To the veriest tyro in matters warlike, it is perfectly obvious that if a military aviator can get so close to an

enemy's position as to make the dropping of explosives even remotely possible, he must have seen things the knowledge of which to his general officer will be worth far more than the killing and wounding of fifty men or the destruction of a few transport wagons. It does not naturally follow that the aeroplane will *never*, even in its present state of development, be used as a species of aerial torpedo. It is conceivable that, having duly fulfilled its primary function as the eyes and ears of the army, it may be sent out to do what damage it can in the general action which follows, but certainly not until that function has been fully discharged.

The logical conclusion we reach, therefore, is that the business of the aeroplane in war will lie far more in the rôle of substitute for cavalry scouts than in usurping the functions of artillery, always being careful to remember that to every rule there is at least one inevitable exception.

After the Circuit of Britain.

In having so ably carried out the organisation of the *Daily Mail* Circuit of Britain race that it has been able to return to the competitors no less than £40 each of the £100 entry fee, the Royal Aero Club has done more than well. It has demonstrated its ability to carry out thoroughly and well the manifold duties devolving upon a ruling and officiating body in connection with a great event such as this was, and at a minimum of expense. On these two counts alone it would deserve commendation and congratulation, but it goes deeper than that. It has demonstrated that the Club is something more than a body which by common consent has been entrusted with the governance of aerial competitions—it has shown that the Club is not unmindful of its duties as a Society of Encouragement. Unfortunately, in the case of too many societies which occupy the position of the R.Ae.C. in relation to other sciences or sports, the main thing seems to be to carry out the organisation of big events with a single eye to making it efficient by sheer force, even where that force represents money which would be better applied in some other way for the furtherance of the objects in view. Nothing in this world can be accomplished properly without efficient organisation, but it is not a necessary consequence that efficiency should be in direct relation to the amount of money expended, and this is what the executive of the Club has apparently realised. It has taken the very proper view that its function is to encourage and govern aviation by all means in its power, and not to exploit the science as something out of which money is to be made for the accumulation of big reserve funds.

No doubt the low cost of the organisation was in great part due to the number of willing helpers who volunteered their services all over the country and who did yeoman service during the days over which the race was spread, and to the fact that the winners completed the circuit in far less time than had been anticipated. But that need not detract from the credit due to the Club for the economy with which its duties in connection with the Circuit were carried out, for in an event of the kind it is quite easy to get rid of money to little purpose unless a close watch is kept upon the expenditure. Again we congratulate the Royal Aero Club upon the excellent showing made by the balance sheet of the race, and also the competitors who have profited by the Club's excellent organisation.

FLIGHT PIONEERS.



Lieut. C. R. SAMSON, R.N.,

One of the four naval officers who graduated in aviation on a Short biplane at the Royal Aero Club's Eastchurch Flying Ground. Although Lieut. Samson took his *brevet* in April only, he on August 19th last put up a British duration record on a Short machine.

THE NIEUPORT TWO-SEATER MONOPLANE.

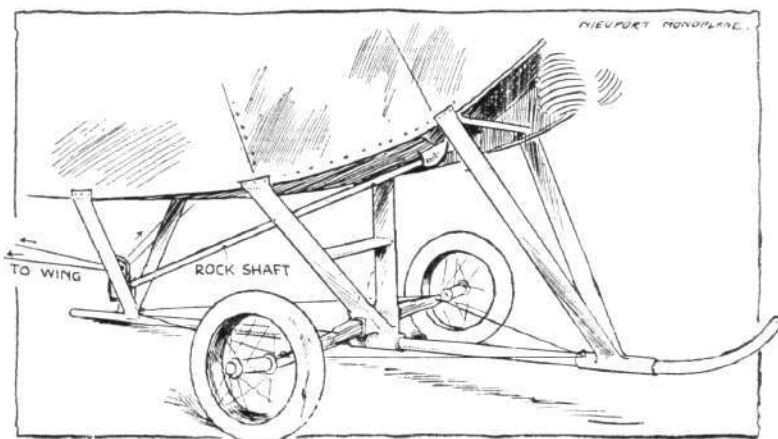
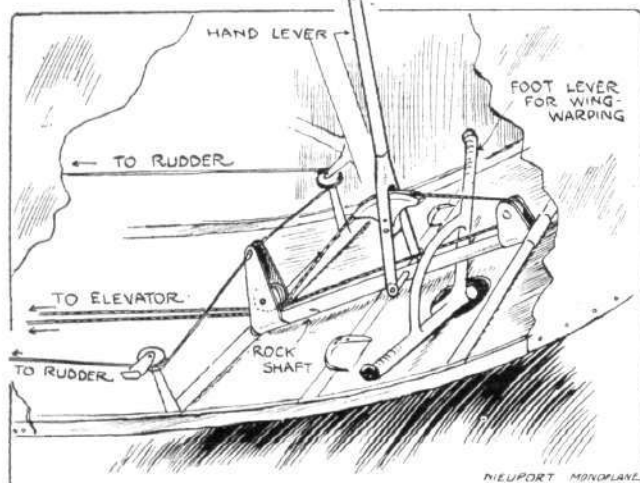
IN the process of evolution of his present machine from its extremely primitive prototype, M. Edouard Nieuport, who has for years been known to the motoring community as a manufacturer of ignition specialities, has kept the three features of simplicity, efficiency and speed as keystones of his design.

He has been eminently successful, for the Nieuport monoplane of to-day is an embodiment of all these features in a most original design. It is in fact, perhaps, the simplest-looking aeroplane that has yet been produced.

To illustrate its speediness, it is only necessary to recall Weymann's victory in the Gordon-Bennett race on a machine of this make. Its efficiency is vouched for by the fact that at one time a Nieuport held the speed record with a 30-h.p. twin-cylinder motor, the speed itself being higher than that made by

feature in their construction is that the I-section main spars of ash are not of even section along their entire length, but vary in thickness according to the strains imposed. Thus it has been found that the greatest strength is necessary at a point situated a few feet from the inner end of the spar, the tie wires being taken into account in this calculation. The main spars are braced well forward to the skid, and stranded-wire cables, previously subjected to a 3-ton test, are employed for this purpose. Above the planes, the tie wires are solid and, of course, much lighter, as there is not so much strain.

On the particular machine here described, which belongs to the two-seater military type, the control is unusual, in that wing-warping is accomplished by the feet, the rudder movement as well as the action of the elevating planes being under the control of a hand-lever. This application of foot-control to the wings is not new, but is decidedly uncommon, and in the opinion of Mr. Maurice Ducrocq, the well-known aviator who represents the Nieuport machines in



On the left sketch illustrating the control system on the Nieuport monoplane, and on the right the Nieuport undercarriage.

Grahame-White with a 100-h.p. monoplane at Belmont Park last year. As for its simplicity of construction, this can be gathered, in a measure, from the following description, but better still from a glance at the actual machine.

Nieuport's study of the reduction of head resistance has contributed largely to the efficiency of his machine. The wings are double-surfaced, of a section closely analogous to that advocated by Horatio Phillips, and they taper towards the tips.

The under surface about the entering edge has a convex curve where it passes the main spar. The trailing edge, too, is given a slightly upward turn, instead of forming a more or less tangential continuation of the cambered portion of the plane, as in the Blériot and most other wings. The maximum camber is about $3\frac{3}{4}$ ins.

It is this particular wing curve, together with the fact that the machine has little head resistance, and flies with an extremely small angle of incidence, that decide its great speed.

Steel enters largely into the construction, the undercarriage, with its central skid and leaf-spring "axle," being made entirely of this material, while the tail members, all of which are perfectly flat, consist of steel tubular frames covered on both sides with fabric.

The body is of wood on the ordinary square girder principle, a few struts in the fore part, however, being steel tubes similar to those used in the undercarriage. The body is unusually deep in the region of the pilot's seat, in order that his whole body may be enclosed, while its shape is such that it can cleave through the air with a minimum of resistance.

A slight dihedral angle is given to the wings, and an interesting

this country, it is, perhaps, a more natural action on the part of the pilot in an emergency. It is, of course, arranged that an upward tilt of one plane is corrected by pressure on that side of the foot-lever. Exactly how this movement is transmitted can be gathered from a reference to the accompanying sketches, wherein it will be seen that a cross-bar is permanently fixed to the upper extremity of a rock-shaft which passes diagonally through the floor of the body to the skid, terminating in a small crank to which the two sets of warping-wires are attached. The movement is thus effected in a simple manner without the use of pulleys and with the minimum amount of friction.

The hand-lever is mounted by a swivel-joint on a short shaft that lies along the floor inside the body, having bearings in two tubular cross-members. A forward and backward movement of this lever operates the elevator through the agency of wires passing round pulleys at both ends of the short rock-shaft. A lateral motion of the lever actuates the rudder wires by means of a crank, which is really formed by an extension of the rear pulley sheave, and is, of course, fixed permanently to the rock-shaft.

It might easily be supposed, owing to the great depth of the body and the low position of the seats, that the pilot's view would be somewhat restricted; but in this connection it must be remembered that the pilot's seat is very little behind the leading edge of the wings, and that the machine flies with the tail unusually high.

A 50-h.p. Gnome motor coupled to an 8 ft. 4 in. Integrale propeller is fitted, and with this power-plant the machine is capable of maintaining a speed of 63 m.p.h.

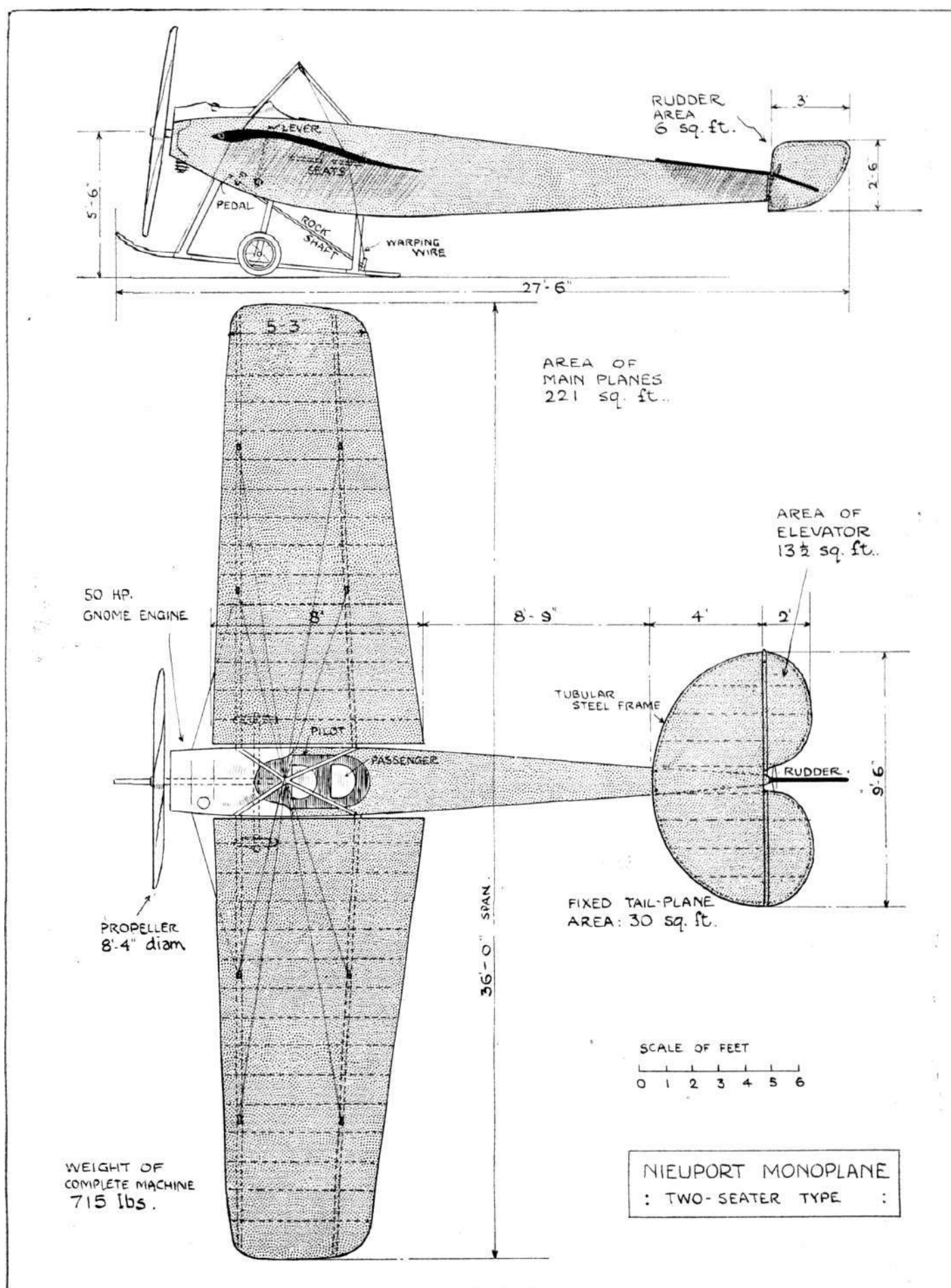
British Boys Build a Triplane.

A MACHINE which should reflect considerable credit upon its builders is in course of construction in the carpenter's workshop at University College School, Hampstead, where, under the direction of Geoffrey Hill, its inventor and designer, a triplane with an Antoinette type of tail and several original ideas, is in course of completion. Master Hill, who is the son of the Vice-Chancellor of London University, is extremely enthusiastic upon his work, and he and his helpers hope within a few weeks to bring the machine out for gliding trips somewhere in the neighbourhood of Cricklewood. Should the glider prove as suitable as its designer hopes, his next effort will be in the direction of an engine-driven plane.

The Unsuccessful Southport Flying Meeting.

AFTER all, those in connection with the Southport Town Council who voted against the carrying out of a flying meeting for

the general good of the town were right in their estimate of the final result, but in all probability they would have been very much in the wrong had it not been that the elements had taken it into their heads to plump entirely for their side. As it was, the miserable weather, which practically precluded all attempts at flight by Mr. Grahame-White and Mr. Hubert, was responsible for the monetary loss which followed upon the event. Apparently, the guarantors will be called upon for the major part, if not the whole, of their bonds, but, incidentally, the result has shown the spirit which exists amongst those who have the town's benefit at heart, in the offer of the Mayor, Alderman Austin, to pay over from his salary a balance of £500 which has not been found necessary to expend in his official capacity. He suggests, although he has paid considerable sums out of his private purse for entertainments to children and old people, that this balance should be devoted to the deficit which has arisen in connection with the aviation meeting.



THE NIEUPORT TWO-SEATER MONOPLANE.—Plan and Elevation to Scale.

A Study of Bird Flight

By Dr. E. H. Hankin, M.A. D.Sc.
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CHAPTER XX.—Lift-gliding of Black Vultures, and Remarks on Lateral Stability.

The following is an instance of a rarely observed phenomenon, namely, an appearance of lateral instability:—

February 6th, 1910.—At 2.9.—A very strong north wind blowing. Much dust in the air, but sun shining. Some cheels flex-gliding at very little height (2 or 3 feet) over the tree-tops. (This, as will be explained later, is evidence of "storm soarability.")

2.45.—There was a lull in the wind, but it had not died down completely. A black vulture was seen flex-gliding nearly directly to leeward at a height of less than 50 metres. It passed me (I was on the roof of my house) at about a hundred metres distance. While it was passing the wind suddenly freshened. The black vulture at once commenced leeward looping. It proceeded thus for about half a mile to leeward. It then began gliding up wind, nearly in my direction, at a height of less than 100 metres. Its wings were dihedrally up. During this lift glide it showed both lateral and dorso-ventral axis instability. As soon as it had advanced a little to windward of my position, it began circling. Instantly the instability vanished. As it circled, it drifted to leeward, showing in each circle a clearly marked gain of height.

It will be worth while to describe in detail the two kinds of instability shown by this bird. The tendency to rotate to and fro round the dorso-ventral axis could clearly be seen to be associated with gain of height. Whenever the bird, instead of proceeding horizontally, began to glide in an upward direction (at a small angle with the horizon), one wing always appeared to gain more height than the other. Hence the bird always became canted over, and then glided off its course for two or three metres to the right or left. It was as if the bird every now and then was climbing a greasy pole inclined at an angle of 20° or 30° with the horizon, and as if it kept slipping off to one side or the other.

This tendency to swerve off its course to one side or the other is always seen in lift-gliding by every species of bird that I have seen in this form of flight. If a bird is gaining height in soarable air there is always this tendency to travel on a curved course. There can be little doubt that this fact is the reason why circling is usually adopted for purposes of gain of height.

The second kind of instability shown by the black vulture in question was a tendency to rotate to and fro round the longitudinal axis. Every now and then, while the bird was moving horizontally, one wing was seen to move downwards for a short distance, while the other wing moved upwards to the same extent. The range of movement of the tips of the wing was two or three inches. The wings appeared to be held perfectly stiffly. No effort to check this tipping could be observed.

The first idea that occurred to me was that this was a case of lateral instability, and that the bird used some adjustment that I was unable to detect in order to check this tendency to rotate round its longitudinal axis. Further experience has shown that another explanation is more probable. Longitudinal axis instability of black vultures is most commonly observed late in the afternoon. Rarely it may be seen in the morning, but then only in cases in which the weather is disturbed, and when it is, therefore, probable that the soarability of the air is not uniform and is of low degree.

It was only after a year's acquaintance with the subject that I met with a case of longitudinal axis instability in a common vulture. In this case the vulture was at a low level, and the time was late in the afternoon. I have since seen another instance.

The reason why this form of instability is met with comparatively frequently in black vultures and so rarely in common vultures is, I think, to be found in the fact that the black vulture habitually soars at a lower level than the common vulture. During the afternoon, as the power of the sun decreases, the air near the earth gradually loses its soarability. The black vulture, owing to its habit of gliding at low levels, is apt to get into patches of unsoarable air. The form of instability in question is more frequently seen in flap gliding than in ease-gliding or circling. The flapping gives an additional proof that the air is not of a sufficient degree of soarability. If soarability is not uniform but occurring in patches, one may expect one wing occasionally to be better supported than the other, with a resulting appearance of lateral instability. Supposing the speed of the black vulture was known, then by counting

the number of oscillations that occur in a given time some estimate could be made of the size of these patches of less soarable air.

In the morning large areas, perhaps a square mile or more or less, may acquire soarability a few minutes before neighbouring areas. But the facts now described suggest that when soarability is decreasing the loss occurs in patches which may be only a few metres in diameter.

I may close this chapter by a few remarks on the question of lateral stability.

By the study of movements of extreme degree round the transverse axis it was possible to discover the nature of the adjustment by which such movements are produced, that is to say, of the adjustment by which the bird is able to maintain its longitudinal stability. That this adjustment is actually in frequent use by cheels is a matter of observation. It may be inferred that it may be in use in other cases to an amount too small to be detected by observation. What degree of automatic longitudinal stability the bird possesses is not settled by my observations. All that can be positively affirmed is that it is not sufficient for all occasions.*

Similarly with the question of lateral stability, it is not likely that the adjustment concerned in maintaining lateral stability will be discovered by observation of birds in normal flight. One may reasonably expect it to be necessary to study cases of oscillation round the longitudinal axis of unusual degree. Of such cases, the extreme degree of canting sometimes observed in circling is not suitable for observation. The bird acquires the canted position so gradually, and returns to a more or less level keel also so gradually, that if the movement is due to an adjustment, this adjustment must come into action so gently that there must be little chance of its coming under observation. The case just described of sudden oscillations round the longitudinal axis of the black vulture is, as has been shown, probably due to atmospheric irregularity, and no trace of any adjustment causing it can be seen. But another case of oscillation round this axis is known to me. Cheels when swooping steeply downwards sometimes show oscillations of large extent round the longitudinal axis. A study of the conditions under which these oscillations occur will be found to give some clue to the probable nature of the adjustment used for maintaining lateral stability. Unfortunately, this case must be described in a later chapter, as the facts will not be intelligible until I have described flapping flight and certain other subjects.

CHAPTER XXI.—Arching.

Concavity of the bird's wing in the fore and aft direction is known as camber. Concavity in the lateral direction, that is called "arching." I have already used the term "flat" to describe the position of the wings when they are in the same straight line with one another, that is to say when there is no dihedral angle. I therefore propose to describe a single wing as "even," if, when seen from behind, it lies in one plane and shows no arching.

The wings of the cheel when ease-gliding are sometimes arched and sometimes even. I have not observed the arched position in cheels during the monsoon season, nor in very cold weather.

Certain facts suggest that the even position of the wings is that of greatest efficiency for obtaining energy from the air. Very often, perhaps more often than not, in the case of cheels, it is difficult to say whether the wings are arched or even, as one is generally not in a sufficiently good position for observing.

On one occasion at Jharna Nullah, in April, 1910, I noticed that before the air became soarable, cheels in flap-gliding flight held their wings in a slightly arched position during the periods of gliding. When circling commenced the wings were held completely even, either flat or perhaps occasionally slightly dihedrally down. Within a minute the wings, still even, could be seen occasionally to assume the dihedrally up position. About two minutes later ease-circling had commenced, and the wings were frequently seen to be strongly arched.

* As by practice my powers of observation have increased, I have been able to see tail-jolting more frequently. In extreme cases each upward jolt of the tail is accompanied by a slight relaxation of the secondary quills (an adjustment for speed), and the wings are placed slightly dihedrally downward. In other cases only very minute up and down movements of the tail can be observed. I have only seen tail-jolting three times in vultures. The smallness of the tail of the vulture and the height at which they soar are probable reasons why tail-jolting is not more often seen in these birds. I have never seen tail jolting in flapping flight.

On only one or two occasions have I been able to see arching of the wings of vultures in Agra. At Ballia Ravine, in Naini Tal, on the other hand, perhaps owing to better opportunities of observation, I was able frequently to see it, both in the case of the common (white-backed) and in the case of the brown vulture. The appearance in these two species of vulture is shown diagrammatically in Fig. 24.

These vultures when starting usually glided horizontally for some way down the valley, on the rising current of air, with their wings

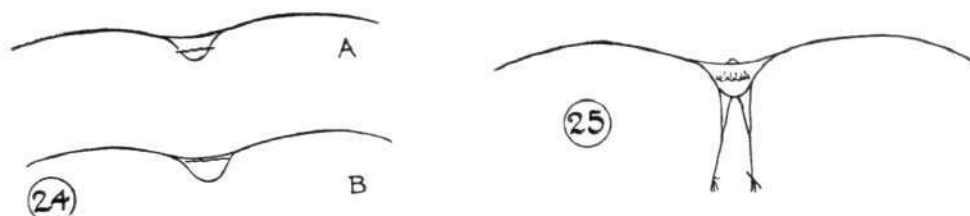


Fig. 24.—Diagrammatic end-on view, showing arching in vultures: A, of common or white-backed vulture (*Gyps bengalensis*); B, of brown vulture (probably *Gyps indicus*). A has a tail at a lower level than the wings.

Fig. 25.—Adjutant seen from behind, with wings arched and legs hanging down.

arched. After travelling for several hundred metres in this way, it was a common observation to see the wings suddenly assume the dihedrally up position, and to become even. This change was at once followed by a gain of height, after which the bird commenced circling.

An observation of arching in a vulture in Agra is as follows:—

August 2nd, 1910, at 4.—A brown vulture seen circling downwards from a height of, perhaps, 800 metres to a height of, perhaps, 400 metres. After this descent it ease-glided horizontally with wings arched. Then it turned slightly in its course, and while still travelling horizontally, its speed was seen to increase. It was then seen to be flex-gliding. I did not observe a double dip at the commencement of this change to flex-gliding, and doubt whether such movement occurred.

Observations that I have carried out on adjutant birds and flying foxes show definitely that arching involves a decrease of lifting efficiency in these animals. It will be sufficient for my present purpose to quote in detail my observations on adjutants.

CHAPTER XXII.—Adjutant Birds.

The adjutant bird is a species of stork of large size. One that I had in captivity for a few months measured nearly 11 ft. across the wings. It is a temporary resident in India, arriving in April or May, and usually departing in October. A few individuals, however, remain during the cold weather months.

Two adjutants that I shot had the following measurements:—

A		B	
Span ...	9 ft.	Span ...	9 ft. 2 ins.
Width of wing ...	1 ft. 3 ins.	Area of one wing ...	4'85 sq. ft.
Length of wing ...	4 ft.	Area of wing tip ...	1'85 "
Weight 7,344 grammes = 16'86 lbs.		Area of phalangeal	
Area of both wings ...	10'5 sq. ft.	quill mass ...	'71 "
Loading per sq. ft. of		Area of one secondary	
wing area ...	1'54 lbs.	quill ...	'166 "
		Area of one secondary	
		quill not overlapped	
		by its neighbour	
		(i.e., exposed directly	
		to air pressure) ...	'105 "

In most respects the flight of adjutants resembles that of vultures. They circle with vultures, and may be seen flex-gliding. In the flex-gliding position the wings are usually not quite so much flexed as in the case of vultures, but the difference between the circling and the flex-gliding disposition of the wings is quite easy to recognise.

But their flight differs from that of vultures in the use they make of arching. Arching the wings in the case of a vulture merely seems to result in decrease of efficiency. In the case of the heavier adjutant, arching the wings results in immediate descent. Arching is the method of descent employed by adjutants in a strong wind or when for any reason they are in a hurry. If an adjutant is watched gliding horizontally, its wings will be seen to be even and set at a slight dihedrally up angle. If it then places its wings in the arched position it immediately begins to glide downwards. Increasing the amount of arching hastens the rate of descent. If when gliding with wings even, one wing is momentarily arched, that wing descends, giving the bird a canted position. If an adjutant is already canted, then momentary arching of the upper wing will cause it to come to an even keel.

The following are examples of my observations:—

July 18th, 1910.—At 5.13. Jharna Nullah.—An adjutant after flex-gliding at 200 metres height began descending almost vertically. Its wings were arched, secondaries tight, and legs half dropped. This was in a strong wind. When about two metres from the ground the arching increased. Another adjutant alighting in a sheltered place showed "stop-flapping" but no arching.

July 20th, 1910.—At 5.52.—An adjutant gliding with wings slightly flexed slowly descended to about 80 metres height. Then it dropped suddenly, frightening away a cheel. Probably it was attracted by carrion that the cheel was eating. The adjutant commenced the drop with a strongly marked double dip. This resulted in steep but momentary inclination of the body (i.e., rotation downwards round transverse axis). Immediately after this inclination its wings were seen to be strongly arched. The legs were hanging down. The head was raised above the level of the wings instead of being below their level as in ordinary gliding flight.

This movement of the head may have been preparatory to striking or threatening the cheel. The wind at the time was light.

That the above surmise, as to raising the head, is not correct, is shown by the following observation:—

August 14, 1910.—At Futteypur-Sikri. At 1.15.—A bird, probably an adjutant, perhaps a crane, descending from about 700 metres to perhaps 400 metres height, showed arching and head raised during part of its descent, besides legs being partly dropped. The bird then drew up its legs and flex-glided away.

It is obvious that raising the head must affect the position of the centre of gravity, and possibly the object of this movement is to produce some change in the position of the centre of gravity.

The amount of arching shown by adjutants in descending is greater than I have observed in ease-gliding vultures. The appearance in end on view of an adjutant with wings arched is shown diagrammatically in Fig. 25.

Steering in the horizontal plane when the wings are arched is effected by what is apparently a dip movement of the inside wing. There is an appearance of the wing-tip being twisted, but the result resembles an increase of arching.

The following is an example of momentary arching of the upper wing being used by a vulture to remove canting:—

August 30, 1910.—At Jharna Nullah. 5.10.—Clouding over. All adjutants settled and vultures descending. A vulture gliding downwards in a canted position arched its upper wing momentarily. Thereupon the amount of canting greatly decreased. The movement observed must have been arching, and not a wing depression, because as the bird diminished its canting, it turned and glided off to the left. Had the movement been a depression the turn would have been to the right.

The question arises, what is the nature of arching? I have a rough acquaintance with the direct or immediate action of all the intrinsic muscles of the wing of an adjutant. I am therefore able to assert that there is no muscular mechanism capable of producing the arched position by any direct action. The facts concerning arching are, firstly, that the wings make a dihedrally up angle with the body, and, secondly, when arched, the air does not impinge on the under surface of the phalangeal quills. That is to say, in the arched position the wing tip has been rotated. Rotation of the wing tip only, when the wings are dihedrally up, would merely produce an appearance of a dip of the wing tips, as I have had occasion of observing. Hence it appears probable that arching is produced by slight rotation of the whole wing while it is in the dihedrally up position. In other words it is probable that arching is a position in which the angle of incidence of the wing is diminished. In later chapters I shall describe other modes of descent in which there is also a change from the normal angle of incidence.

In the case of the flying fox there is a muscle which by direct action can produce arching by bending downwards at the carpal joint. A few observations have led me to suspect that in this animal also there is a decrease in the angle of incidence in the arched position.

(To be continued).



A Superior Military Certificate Obtained on an Antoinette.

FOR the first time a French officer, Lieut. Rochette, has secured the superior military *brevet* on an Antoinette monoplane. On the 28th ult. he covered, for his third flight, the course between Mourmelon and Revigny, 104 kiloms., at a height of 500 metres.

THE AVERAGE WEATHER OF OCTOBER.

By T. F. MANNING.

ALTHOUGH we often have many calm and sunny days in October, its average record shows a great fall from the standard of September. It is the wettest month of the year in London and the south-east (but not in all parts of the country), and, what with the increase of gales and fogs, and the rapidly-diminishing daylight and sunshine, October is not a month to gladden the airman's heart.

Fogs are 25 per cent. more numerous than in September, and we have in this month close on ten times as many as in July. The average is five fogs during the month. But, as in September, they appear principally at night and in the morning, and they are not so dense as in November and December.

Gales are nearly half again as frequent as in September, although they fall far short of the year's maximum in December and January. There are twice as many gales in October as in June, the second week being generally the stormiest period of the month. Still, the average number of gales for the whole month is not large, only 1½, and there is compensation in the curious fact that October is one of the three months which have the largest number of calm days—that is, days on which the velocity of the wind is less than two miles an hour. In this respect the order is—November with the greatest number of calm days, September next, and October third.

There are many rainy days, and the rainfall is the highest for the year, three-fifths of an inch more than in September, and double the amount measured in February, the driest month.

Thunder is now very rare, being eight times less frequent than in July. The average is one thunderstorm in three years.

Hail is still more rare, one fall in six years. But it has left the minimum (which occurs in July and August), and is slowly increasing in frequency.

Snowfalls do not become of any account until November. In October we have had only fifteen snowfalls in one hundred years, and most of these occurred during the last week.

It has been observed that, as a rule, brisk east winds blow for a few days about the end of the second week, and they are generally followed by a fine quiet period, St. Luke's summer commencing about the eighteenth of the month.

In FLIGHT of September 2nd a comparison was made of September weather with that of October. The following figures show the relation between October average weather, and what we are to expect in the succeeding month:—

	October.	November.
Ten years' gales ...	16	19½
" fogs ...	50	52
" dense fogs ...	10	13
" thunderstorms ...	3½	2
" hail-storms ...	1½	2½
" snow-falls ...	1½	7
" rain-days ...	150	139
Average rainfall (Greenwich) ...	2'58 in.	2'22 in.
Mean temperature (Greenwich) ...	50'0	43'5
Hours of sunshine (Greenwich) ...	93	50
Degree of humidity (Greenwich)...	85'0	87'3

Table of Weather Phenomena in October.

The figures show the numbers of each event in one hundred years.

Day.	Gales.	Fogs.	Dense Fogs.	Snow.	Hail.	Thunder.	Mean Temp.	Rain Days.
1 ...	4	14	4	-	-	4	54'1	46
2 ...	6	18	7	-	1	1	53'8	50
3 ...	5	11	3	-	-	2	53'5	40
4 ...	4	14	4	-	-	1	53'2	47
5 ...	2	17	4	-	1	2	53'0	44
6 ...	4	16	2	-	1	1	52'7	60
7 ...	7	21	3	1	-	-	52'5	57
1st week ...	32	111	27	1	3	11	-	344
8 ...	6	14	2	-	1	3	52'1	54
9 ...	7	15	3	-	-	1	51'7	52
10 ...	7	11	4	-	-	2	51'3	54
11 ...	5	15	1	-	1	3	51'0	55
12 ...	3	19	2	1	-	-	50'6	41
13 ...	8	24	7	1	1	-	50'3	42
14 ...	5	22	3	-	1	1	50'1	52
2nd week ...	41	120	22	2	4	10	-	350
15 ...	6	17	7	-	1	4	49'9	50
16 ...	2	22	2	-	1	1	49'8	57
17 ...	6	18	2	-	1	1	49'6	40
18 ...	3	16	2	1	1	-	49'5	44
19 ...	9	17	2	-	1	1	49'3	55
20 ...	6	16	1	1	1	1	49'0	44
21 ...	5	19	2	1	-	1	48'8	50
3rd week ...	37	125	18	3	6	9	-	340
22 ...	5	15	2	-	-	1	48'5	52
23 ...	3	17	5	-	-	-	48'2	47
24 ...	7	14	5	1	1	-	47'9	46
25 ...	6	19	3	1	1	1	47'6	46
26 ...	6	18	3	1	-	1	47'4	54
27 ...	5	11	4	1	1	1	47'3	42
28 ...	5	15	2	1	1	1	47'2	49
4th week ...	37	109	24	5	4	5	-	336
29 ...	4	14	3	2	-	-	47'0	49
30 ...	5	15	2	2	-	1	47'0	49
31 ...	5	8	1	-	-	-	46'8	36
Whole month	161	502	97	15	17	36	50'0	1,504

AERONAUTICS AT THE NORTHAMPTON INSTITUTE.

By F. HANDLEY PAGE.

THE Northampton Polytechnic Institute may fairly claim to be the first technical institute to start aeronautical engineering work as a part of the regular course of their evening classes. In 1909, shortly after the historic flight of M. Blériot across the Channel, Dr. Mullineux Walmsley, Principal of the Institute, in conjunction with Mr. C. E. Larrard, A.M.I.C.E., M.I.M.E., the Head of the Mechanical Engineering Department, inaugurated the first series. The interest aroused by this step and the good attendance of students made an enlargement of the course necessary.

In the next session in 1910 the course was put under my charge, and the equipment of an aeronautical laboratory was laid out. The course for the new session, which commenced on Monday, September 25th, includes lecture, laboratory, workshop and drawing office work, and there is both an ordinary as well as an advanced section.

Of the details of the lectures there is no need to give an extended account, as this is already scheduled in the prospectus of the Institute, but the advanced portion calls for more detailed comment. In order to better deal with the needs of a specialised branch such as aeronautics, the advanced lectures are split up into a series on special subjects, commencing with six lectures on the Design of Aeroplane Supporting Surfaces, on Friday, October 13th, at 7.15 to

8.15 p.m., and continuing on succeeding Fridays at the same time.

The advanced laboratory work can be taken in conjunction with these lectures. A later series of lectures includes one on Propellers, on the Stability of an Aeroplane, and on the Practical Design of Aeronautical Apparatus.

The laboratory is one of the best equipped in this country. There is a large wind tunnel, 6 ft. by 6 ft. in section, and this is available for experimental work on planes and models in an artificial wind blast. The tunnel is all complete with the necessary fans, electrical driving and control gear, and has three delicate balances with which to make measurements. These have been specially designed for this wind tunnel.

There is also an experimental stream-line apparatus, by means of which one can see the air flowing round a plane, and thus get a picture of what actually happens when an aeroplane is moving through the air. Amongst some of the other apparatus is a run-way track for finding the speed at which certain planes lift when moving through the air, a piece of apparatus designed by the Mechanical Engineering Department of the Institute.

In the workshop part of the course a full-size monoplane is under construction, and a 30-h.p. engine purchased, so that everything is now ready to finish this off this session.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 3rd inst., when there were present:—Mr. R. W. Wallace, K.C., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Col. J. E. Capper, C.B., R.E., Prof. A. K. Huntington, Mr. F. K. McClean, Mr. C. F. Pollock, Mr. A. Mortimer Singer, and Harold E. Perrin, Secretary.

New Members.—The following new Members were elected:—

Lieut. John Frederick Lecky and Lieut. Ernest James Strower.

Aviators' Certificates.—The following aviators' certificates were granted:—

142. Capt. Frederick William Richey (Bristol, Brooklands).

143. Capt. Steele Hutcheson (Bristol, Salisbury).

144. Lieut. C. L. N. Newall (Bristol, Salisbury).

"Daily Mail" Circuit.—Cheques amounting to £1,200, being a return payment to the competitors out of entry fees for the *Daily Mail* Circuit, were drawn.

International Code of Aeronautical Signals and Signs.

The question of establishing an international code of aeronautical signals and signs will be considered at the conference of the Fédération Aéronautique Internationale in Rome in November next, and the committee of the Royal Aero Club will welcome any suggestions from aviators, aeronauts, airship pilots and others interested in the movement.

It is proposed to hold a meeting shortly to go thoroughly into the question, and suggestions are invited on the following points:—

Signals placed on the ground.

Communication between an aviator when flying and persons on the ground.

Aeronautical maps.

Army and Navy Aviation Prize, £1,000.

The attention of Commissioned Officers in His Majesty's Regular Army, the Royal Navy, and the Royal Marines, is drawn to the above prize presented by Mr. A. Mortimer Singer.

The prize of £1,000 is divided as follows:—

Army ... £500 | Navy and Marines £500

The entrance fee is £1, and the rules can be obtained from the Royal Aero Club, 166, Piccadilly, London, W.

Entries have been received from Capt. E. L. Gerrard, R.M.L.I.,

Lieut. C. R. Samson, R.N., Lieut. R. Gregory, R.N., and Lieut. W. Parke, R.N.

British Empire Michelin Cup £500.

Intending competitors are again reminded that the competition or this year closes on October 31st.

The minimum distance to be covered in order to qualify for this prize is 250 miles.

This prize can be competed for on any recognised flying ground.

Entries must be sent to the Royal Aero Club, 166, Piccadilly, W., from whom full rules can be obtained.

The Brighton-Shoreham Aerodrome has deposited with the Royal Aero Club the sum of £50 to be awarded to the competitor who makes the longest flight (not being less than 250 miles) in the above competition at the Brighton-Shoreham Aerodrome.

British Empire Michelin Cup (No. 2).

Intending competitors are again reminded that the Competition for this year closes on October 15th.

The only flight so far recorded is that of Mr. S. F. Cody, on September 11th.

Entries have now been received from F. P. Raynham (Avro biplane) Ronald C. Kemp (Flanders monoplane), and C. L. Pashley (Humber monoplane).

COURSE.—Competitors may select their own circuit of 125 miles, but the start must be made from a flying ground approved by the Club, and the proposed circuit must be submitted to the Club before the flight is made. The rules stipulate that three clear days' notice must be given to the Secretary of the Royal Aero Club.

Late Hon. C. S. Rolls and Cecil S. Grace.

Several residents at Eastchurch have expressed the wish to place a stained glass window in the Church at Eastchurch, in memory of the late Hon. C. S. Rolls and Cecil Grace, both of whom made their first experiments in flying in the district.

Contributions previously acknowledged	£86	14	0
D. Graham Gilmour	1 1 0
Mrs. J. H. Granger	0 5 0
	£88	0	0

HAROLD E. PERRIN,
Secretary.

166, Piccadilly.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor or *FLIGHT*, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

Parkside Aero Club (2, EDBROOKE ROAD, PADDINGTON).

THE Paddington Aero Club have now commenced the winter model-making, and have a workshop for the convenience of members. Every facility is given to members joining who have the use of the ground and workshops. For full particulars please address the Secretary.

The Parkside Aero Club have now the glider ready on the ground, and would welcome new members.

MODEL CLUBS.

Aero-Models Assoc. (N. Branch) (15, HIGHGATE AVENUE, N.).

ON Saturday last a very successful model flying competition was held at the flying ground of this branch at Bishop's Avenue, East Finchley, N. Despite the adverse weather conditions all but one of the twenty entries put in an appearance, resulting in excellent flying. The judging was conducted by the hon. secretary, Malcolm B. Ross, who was very ably assisted by Mr. H. Brosse, and Mr. W. Wether. A first prize of 10s. 6d. was kindly offered in each event by the Earl of Ronaldshay, M.P., and a second prize of 4s. was awarded by the club. Results:—Event I, "Getting off ground" competition: 1st. A. Haulberg, 1,195 ft.; 2nd. H. R. Weston, 876 ft. 6 ins. Event II, competitors flew their models towards a post 200 yards from start, the winner being the one to land nearest the post: 1st. R. F. Mann, 77 ft. from post; 2nd. R. P. Grimmer, 136 ft. from post. Owing to the tremendous rate of the wind some of the competitors

were forced to add more rubber to their models to get them well up. There were some bad smashes, but these were comparatively few. Mr. Haulberg's monoplane, after rising from the ground, flew out of sight into an adjoining field. The Mann model proved itself worthy of its name, and, after turning with the wind repeatedly, flew across the aerodrome at a remarkable speed. Mr. Weston and Mr. Hurlin turned out good flights with their W.H.C. flyers, an official flight of one dropping only 23 ft. short of the post in Event II.

Arrangements are being made to secure a members' room, and meetings and discussions will be arranged for the winter; full particulars of this will be announced later. The secretary would be pleased to receive catalogues of models and accessories. New members are always welcome, and particulars can be had upon application to the hon. secretary.

Blackheath Aero Club (5, LIMESFORD ROAD, NUNHEAD, S.E.).

MEMBERS of the Club had a very trying time this week-end, several models having to succumb to the very boisterous wind, which at times must have exceeded 50 miles per hour; but in spite of this, a number of good flights were made, the ¼ mile being flown with considerable ease.

Further meetings will be held in the Eltham district to-morrow (Oct. 7) and Saturday (Oct. 14th), at 3.30 p.m., and members will be informed of the details by post on or before these dates. Full particulars will also be sent to anyone interested on application to the hon. sec. at the above address.

Kite and Model Aeroplane Assoc. (27, VICTORY RD., WIMBLEDON).

ON Saturday last this association held an open kite competition on Wimbledon Common. 26 competitors out of 30 took up their positions at 3 p.m., although the gale that was blowing at the time was very trying, many having lines which were too light for a stiff wind. The competition was very keenly contested. Mr. T. Gregg was flying a Siesta bow-string kite in splendid trim, and would no doubt have won had he not been cut away by another competitor.

The judges, Messrs. W. B. Brooke, F. Pringuer, and W. H. Akehurst, made the following awards, each receiving a "Brookite" as prize, ranging from 30s. value to 5s., presented by Mr. W. B. Brooke, of Brookite fame:—1st, Mr. Bath, Roloplan, 44 marks; 2nd, Mr. C. Griffiths, box and wing, 40; 3rd, Mr. C. Hayes, Brookite, 39; 4th, Mr. W. K. Styles, Brookite, 38; 5th, Mr. C. Smith, box and wing, 34; 6th, Mr. P. Jell, box and wing, 32. Mr. Bath's kite maintained a good angle, and was most stable throughout the contest.

Mrs. Akehurst presented the prizes, and congratulated the winners on having flown so well in such a trying gale.

The winner of the third prize, Mr. Hayes, asked that the prize be presented to the next man, as he was interested in the Brookite firm.

Mr. Akehurst proposed a vote of thanks to Messrs. Brook for having presented the prizes for the competition, as well as giving every competitor a souvenir kite. He said, if it had been known that each competitor would receive a prize, the Common would not have held them.

Liverpool Model Aero Club (39, BROOK ROAD, BOOTLE).

A GOOD meeting was held on Saturday, the last day open for Mr. Harrison's prize, which was won by W. S. Ledward with a really good flight of 510 ft., with a strong and gusty following wind; A. G. Pugh, second, about 300 ft. There will be flying meetings all through the winter whenever possible. Next Saturday, prizes up, and members are earnestly requested to attend. Committee meeting, 17th inst. General meeting, 20th inst., when the winter's work will be gone into. The competitions next week will be duration and a point-to-point race, and an entry fee of 2d. will be charged.

Manchester Model AeC. (40, BIGNOR STREET, CHEETHAM).

HALF a gale was blowing across the Manchester aerodrome, Trafford Park, on Saturday, when a flying meeting was held by the

members of the above club. However, the wind and rain did not manage to spoil the flying, for numerous and exciting flights were made by the models, most of which were of the Mann type. The best flights of the afternoon were Mr. D. Wood, 1,200 ft.; Mr. Williamson, 1,180 ft.; Mr. Beswick Willcock, 990 ft.; and Mr. Jones, 681 ft. The flight of Mr. Williamson's model was a notable one. As the model left his hands, it quickly mounted upward to a height of about 40 ft., and then, finding a cross-current, the model flew over a works and was lost to sight. A chase was soon started, the model being discovered a quarter of an hour later reposing undamaged on a railway track. Altogether the flying was extremely creditable despite the wind and showers of rain, and the owners of the models are to be congratulated upon the success of their machines under such adverse circumstances.

Another meeting will take place at the aerodrome to-day (Saturday) at 2.30 p.m. The secretary, Mr. Kenmure Kinna, would be pleased to welcome new members on the ground.

Nottingham Model AeC. (1, FOURTH AVENUE, SHERWOOD RISE.)

UNDER the above title a model club has been started, and those desirous of joining should address the Secretary, from whom full particulars can be had. The object of the club is to study aviation problems, build working models, and to gain a general knowledge of the art of aviation. Workers only are required. A good programme for the future of the club is now in hand.

Scottish Aeronautical Society Model Aero Club.

A DEMONSTRATION of kite and model aeroplane flying will take place at Barrhead Aerodrome to-day (Saturday), at 4 p.m. A large attendance of members is requested. Intending members are also cordially invited to take part. A kite flying competition will be held shortly. There will be two classes, seniors and juniors, and several good prizes have been assured for both classes. It is expected that a competition for model hydro-aeroplanes will be held at an early date. Full particulars will be announced later. Several of the members are pushing ahead with this class of machine, and the first water trials are expected within the next week or so. A small flying meeting was held at Barrhead on Monday last, the autumn holiday. Owing to the inclement weather, the flights were not so good as usual. Best duration flight was made by Mr. J. S. Gordon's monoplane No. 20 with 40½ secs. Mr. Jas. Donaldson was next with 34 secs.

SCHOOL AERO CLUB NOTES.

By ROBERT P. GRIMMER, General Secretary, British Federation of School Aero Clubs.

AT the model aeroplane competition held at East Finchley on the last day of September I was very much gratified by the presence of a number of schoolboys, who manifested an obviously keen and intelligent interest throughout the whole of the proceedings. It is to be regretted, however, that more of these youthful visitors did not actually take part in the competition, instead of being contented with the rôle of mere onlookers. As I have had occasion to point out before, model aeroplane flying possesses advantages which no other sport can afford; it supplies a most interesting handicraft, its mathematical and scientific aspects give ample scope to the genius of the student, and from an athletic point of view the flying of a model aeroplane calls for far greater exertion than any other sport, football and cross-country running included. And, above all, the model maker is always in a position to make fresh discoveries. Much of what is already known about aviation has been derived from experiments with models, and many of the great problems still unsolved will eventually be conquered by the same means. But the model-maker must not work by himself; he must have frequent intercourse with other enthusiasts, and he must, above all, attend competitions where he will see all the leading machines in flight. Thus he will learn the flying capabilities of different types, and, incidentally, how the cheap foreign-made machines compare with models of British design and manufacture. The Federation hopes next year to organise competitions for schoolboys only, but for the present I strongly advise all our members to join one of the two bodies which control the sport of model-flying in Great Britain. The subscription for youths to the Aero-Models Association is 5s. per annum, and full particulars can be obtained from the secretary, Mr. A. B. E.

Cheeseman, Caxton House, Westminster. The subscription for youths to the Kite and Model Aeroplane Association is 2s. 6d. per annum, the secretary being Mr. W. H. Akehurst, 27, Victory Road, Wimbledon. Besides the holding of many competitions without extra cost to members, both associations arrange numerous lectures and debates during the winter months, no charge for admission being made to members or their friends.

Parents are constantly writing to me to enquire if aviation affords any prospects as a profession, and if, to use a colloquialism, there is any money in it. Presumably, even parents read FLIGHT sometimes, and, acting upon this assumption, I am now making a few remarks on this subject. Of course, I am not as competent to answer these questions as some of the big manufacturers, but I think one is justified in replying as follows. All over the Continent men who were mere mechanics a year or two ago are now thriving manufacturers and pilots, and several of the older firms have already amassed considerable fortunes. As far as this country is concerned, one cannot say nearly as much, for the simple reason that the British purchaser of an aeroplane is so unpatriotic that he prefers a foreign machine to one designed and manufactured in his own country. But all the principals of firms that I know—and I am in touch with a good many—inform me that a great "boom" is imminent, and that once that comes the industry will never look back. Therefore, considering the fact that in ten years' time the aeroplane will rival the motor car as a means of locomotion, I think it can be safely assumed that for a fellow who means to throw himself heart and soul into the work, aviation affords considerable financial prospects as a profession.

A Flying Member of Parliament.

DR. E. REYMOND, who is one of the leading men in the French Parliamentary Party, representing the Loire Department, is now himself an expert flyer, using a Blériot monoplane. On Wednesday last week he started from Étampes at 7 a.m. and flew to Nevers, arriving there at 9.15. The following morning he started at 11 a.m.

for his constituency at Montbrison, and descended at Boutheon at 12.50, having covered the 156 miles at a speed of 100 m.p.h. On Sunday he was flying at the aerodrome for 30 minutes, in spite of a very disconcerting rain, and after paying a visit to Montbrison he re-started for St. Galmier. Altogether that day he was an hour and ten minutes in the air, attaining an altitude of 1,500 metres.

BRITISH NOTES OF THE WEEK.

Mr. B. C. Hucks' Exhibition Flights.

MR. HUCKS has been during the week continuing his admirable exhibition flights in the country, using as before his well-known Blackburn "Mercury" monoplane. On Tuesday he put up five flights from the Ely Racecourse, although some roughish winds were asserting themselves. During one of these he made a trip from Ely Racecourse to the Cardiff Docks, and in the afternoon, about half-past two, he made a second ascent under disadvantageous conditions. The wind dropped during the afternoon, rendering the conditions more suitable, and by way of demonstrating his accuracy of aim he dropped a lady's chateleine bag from a height of about 800 ft. almost at the exact spot that he had pre-arranged that it should come to rest. On Wednesday Mr. Hucks started from the Ely Racecourse at Cardiff at 6.16 a.m. to fly to Newport, where he arrived at 6.37, for the purpose of carrying out another series of exhibition flights. Circling round the town to take his bearings, he descended in Shaftesbury Park, and during the afternoon gave a sample of his powers, flying over Scard Farm and the grounds of the Caerleon Asylum, then steering over the racecourse and crossing the river twice, and re-descending to his starting point.

An Active New Pilot.

MR. J. L. LONGSTAFF, who only last week secured his certificate from the Royal Aero Club on Lieut. Snowden-Smith's racing Farman, has serious intentions of participating in the Michelin Cup competitions. He will use for this the 60-80-h.p. Green-engined Howard-Wright, and, in addition, he intends having a cut in to break the existing all-British duration record.

Ripping the Army Airship.

In the envelopes of dirigibles, as of balloons, there is a panel of fabric so cemented to the main body of the material as to enable it to be ripped off by pulling a cord. In ballooning, the ripping panel is used during the last stage of descent in order to destroy the buoyancy, and to prevent the rebound after the car first touches the earth. In the use of dirigibles this practice is of course not followed as a rule, but as it might be necessary, in emergency, to "rip" before touching earth, it was determined at the Army Airship

Factory to see if the proceeding was feasible, and likely to result in much or little damage to the machine. The airship "Gamma" was employed for the experiment, and the conditions were such as to have enabled the crew to leave the ship by sliding down the trail ropes. The envelope immediately collapsed when ripped, and the airship fell to the ground, but subsequent inspection showed that only stays and wires that could be easily replaced had been damaged by this somewhat drastic trial.

Model Exhibition at Westminster.

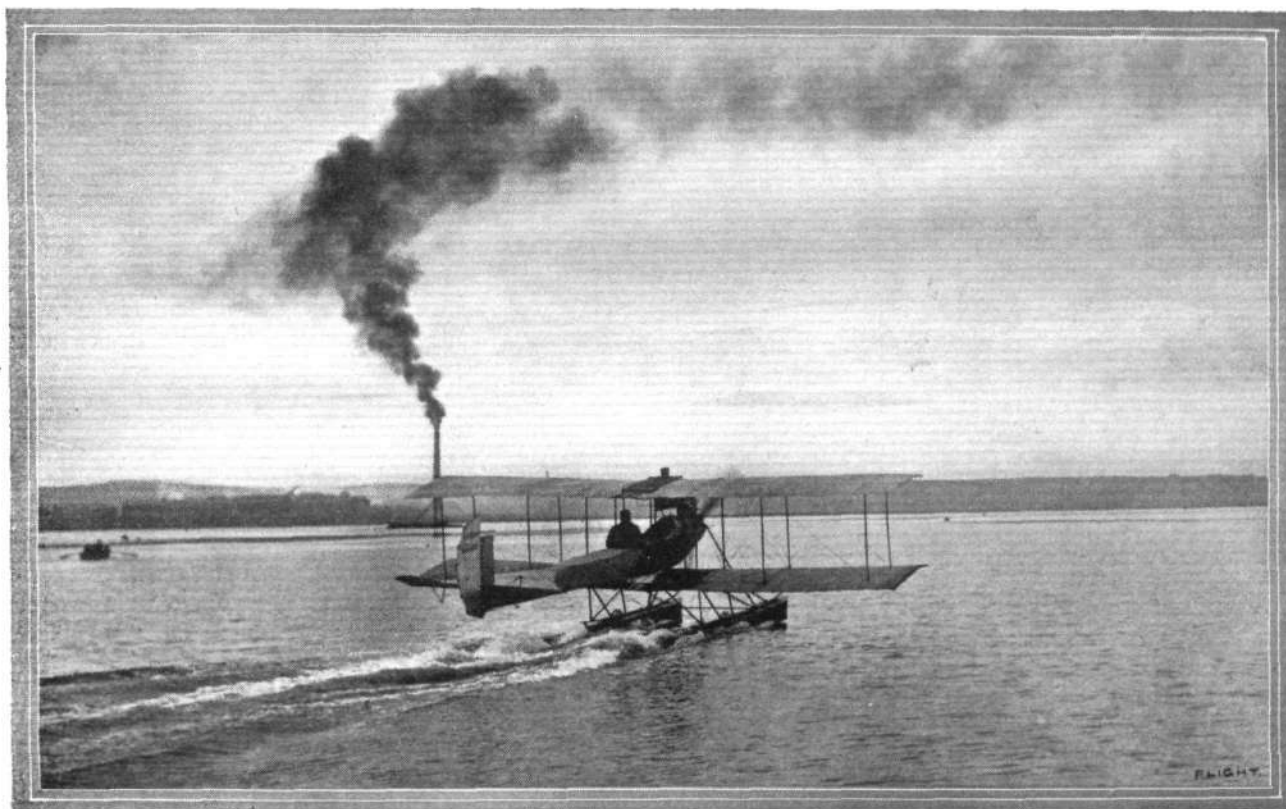
THE Exhibition organised by the *Model Engineer* always produces a splendid collection of models of various sorts, and of late years there has been a fair sprinkling of aeronautical models. This year's Exhibition is to be at the Royal Horticultural Hall, Westminster, from October 13th to 21st, and full particulars can be had from Messrs. Percival Marshall and Co., 26-29, Poppins Court, Fleet Street, E.C.

A Propeller Offer.

THE WESTON HURLIN Co., with the object of drawing attention to the efficiency of their propellers, are offering in our advertisement pages to make a limited number of propellers for free trial to aviators for a week or fortnight, without any obligation to purchase. Makers showing confidence in their goods in this way are worthy of encouragement.

Aero Models Association.

IN connection with the *Model Engineer* Exhibition being held at the Royal Horticultural Hall from October 13th to 21st, the Aero Models Association have arranged for a series of model competitions. These include events for models rising from the ground under their own power, winding machines for elastic-driven models, model engines, scale models of existing machines, manufacturers' show models, and models showing the greatest merit from the point of design and workmanship, in view of reproduction in a full-sized machine. The latter competition is divided into two classes, one for amateurs and the other for amateurs and manufacturers.



A NAVAL AERO-HYDROPLANE BEING TESTED AT CAVENDISH DOCK, BARROW-IN-FURNESS.—Commander Schwann, of H.M.S. "Hermione," carrying out early morning trials on the Roe biplane, which has been fitted with float attachments of his own invention. The uninitiated should note that the smoking chimney-stack has no connection with the biplane.

FROM THE BRITISH FLYING GROUNDS.

Barrhead Aerodrome.

THE General Officer Commanding-in-Chief Forces in Scotland has appointed Capt. Forsyth, R.F.A., and Lieut. Warrand, Black Watch, to undergo a course of flying at the schools of the Scottish Aviation Company at Barrhead.

The four other pupils, Messrs. Clinkskill, Thompson, Burke and Goran are all doing well, and two are expected to qualify for their brevet at an early date.

The equipment now consists of Blériot monoplanes, Farman type biplane, and a new military type passenger Avro-cum-Breguet biplane, and two other machines now building.

Mr. R. W. Philpott has been engaged as Chief Pilot Instructor. It will be remembered that Mr. Philpott was one of the first Bristol pilots to get his certificate under the new rules.

Brooklands Aerodrome.

CALM clear weather set in last week and continued till the week-end. I suppose it is no use grumbling, but it does seem strange that the wind should invariably blow hard on Saturday afternoons. On Wednesday morning we saw some good flying by Bell on the Deperdussin. After completing three circuits he handed the machine over to Mr. Santoni, one of the Directors of the Deperdussin Syndicate. He rose slowly, and it could be seen that, if he attempted a turn, he would probably meet trouble. However, he kept on, and at the end of the track by the railway his right wing collided with a telegraph pole, slewing the machine round and causing it to dive nose down on to the bank. The machine was badly damaged, but Mr. Santoni escaped absolutely unhurt. He is to be congratulated on such a lucky escape. Venkatasubba Setti was out rolling on the Avro biplane. After two or three straight lines he turned off and ran into the sewage farm. He is a vegetarian, and it is thought that he may possibly have had some irresistible attraction for the cabbages which grow that way. Spencer was out on his Spencer-Farman, giving his pupil, Mr. Frank Ballard, passenger flights. Afterwards he handed the machine over to his pupil, who made some good straight flights. The Walton and Edwards Elephantoplane made an appearance and put in some good straight flights at about 6 ft. off the ground. Blackburn, the pilot, has fitted straight exhaust pipes to keep the gasses out of his eyes. The 100-h.p. Clerget had a fairly healthy



Mr. I. L. Longstaff, who obtained his brevet last week on Lieut. Snowden Smith's racing Farman.

exhaust before, but now it reminds one of a Dreadnought as it sails up the ground, firing a regular broadside on to the sheds. Blackburn says he intends putting an extra pair of socks on when he goes out for a turn. The Blondeau School was at work, and Mrs. Hewlett made some good circuits with Graham Wood as passenger. Afterwards the latter indulged in some rolling practice. Pizey was flying, with Major Benwell, of the Scinde Horse, as passenger, and rose to a good height. In the evening Pizey and Fleming were up on the Bristol, and Spencer flew a few circuits.

Thursday morning was fine, but a little breeze sprang up fairly early, and rendered conditions only fit for experts. Bell got away on the two-seated Deperdussin, and took as passenger Mr. Woodman. Mr. Woodman, who lost one of his right limbs in a motor cycle accident some time ago, was very pleased with the flight, and was making inquiries, if necessary, as to the best sort of control suitable for himself. He rides a motor bike with the greatest of ease, and frequently competes in races; he is certainly a remarkable man. The Elephantoplane was out early, making some straight flights, but retired for adjustments. Ballard was rolling and making straight flights on the Spencer-Farman, and Major Benwell was having passenger trips on the Bristol. Shortly after 10 o'clock a venerable old gentleman, surrounded by a bevy of fair ladies, approached the Roe shed and offered much shekels in exchange for an exhibition flight. Accordingly Louis Noel went out on the Farman and did some circuits. The old gentleman, who turned out to be Abdul Bahia, the High Priest of Bahaiism, was visibly impressed, and rejoiced, saying, in a loud voice, "Bong! Bong! Marain-y-Schraba!" which, being interpreted, is "Gee whiz! What a stunt!" The Avro School was temporarily out of action owing to a lacerated propeller. In the evening some excellent flying was got in. The Avro School appeared in force; Mr. Duigan, the Australasian expert—who, by the way, has an Avro on order—and Jenkatasubba Setti were out rolling, the former showing good control of the machine and making straight flights. F. P. Roughan then covered some circuits and steered some figures of eight, whilst S. V. Sippe flew some circuits at a good height. Fleming and Pizey were out on the Bristol doing short banked turns and spiral glides. Spencer and his pupil, Frank Ballard, were up at a great height, finishing with a fine glide. The "Ouseley Bird," shrieking defiance to the elements, was drifting round in circles, piloted by brave Percival.

Friday morning was fine, and the Avro School got down to it. Duigan, Setti and Young were rolling and straight flying, and Roughan and S. V. Sippe were doing circuits. Spencer was teaching his pupil; Major Benwell was rolling on the Bristol, and Percival on the "Ouseley Bird" was flying well and at quite a good height. The evening turned out badly, the only people to go out being Fleming, who did a few circuits on the Bristol, and Pixton on the E.N.V. Bristol, tuning up for the Manville.

Both Saturday and Sunday were blank days owing to a gale of wind, which nearly blew the sheds down and filled our eyes with sand.

Monday morning, contrary to expectations, dawned clear and calm, and some decent flying was got in. The Avro biplane was in the air; S. V. Sippe flew some circuits at about 200 feet, and D. G. Young put in some good low straight flying. The Walton and Edward's biplane was out, and got off well, flying very steadily at about 6 feet off the ground. Spencer and Mr. Frank Ballard went for a trip together, the latter doing some straight flights afterwards. Lieut. Harford, whose leave is limited, has joined the Bristol School, and had a passage flight with Collyms Pizey. Shortly after, Major Benwell took the machine over for straight flying. Unfortunately he made a bad landing, breaking the skids and the left hand wing. He himself got off with a cut on the chin from a wire. The Blondeau-Hewlett School was at work, both Mr. Blondeau and Mrs. Hewlett doing circuits in good style. Graham Wood, a pupil, then got in some more or less straight rolls. In the evening Pixton gave us a good exhibition on his E.N.V. Bristol. It is a very fast machine, and rises very quickly. The star performance of the evening was the flying of the two-seater Deperdussin. Three passengers were taken—Captain Richey, Lieut. Reynolds of the Army Air Battalion fame, and Mr. Louis Coatalen, the designer of the Sunbeam motor car and a well-

known racing motorist. The way this machine climbs is very fine. The Avro School was busy. Roughan took the Farman out for some circuits, and then tried the Avro biplane. Venkatasubba Setti was rolling, and Young was making straight flights. S. V. Sippe took the machine up to about 300 ft. and flew half-a-dozen circuits. Spencer flew right out of the track at a good height and went for a run across country. Percival was flying in great style on the "Ouseley Bird," ascending to a height of about 600 ft.

Liverpool Aviation School, Sandheys Avenue, Waterloo.

No flying has been possible during the past week owing to equinoctial gales, with the exception of Monday last, when Mr. Hardman took the school machine for his third rolling practice. There was a strong north wind blowing at the time, and Mr. Hardman had the misfortune to be caught by an extra puff which resulted in the machine leaving the ground across the wind, and a bad landing was effected from about 15 ft. high, three of the chassis members and the propeller being broken, but no other damage. Repairs to the machine were effected within 24 hours of the mishap.

London Aerodrome, Collindale Avenue, Hendon.

Blériot School.—Fog up to 8 o'clock on Monday last week prevented flying, but afterwards Messrs. Driver and Parr put up some straight flights, Mr. Corbett Wilson making straight lines on the ground. The next day Messrs. Driver and Parr were at straight flights again, while Messrs. Sacchi, Prensziel and Tremlett were busy with the handling of the machine on the ground, later Lieut. Low joining the other pupils.

Mr. Driver, who is making rapid progress, has commenced to fly quite neatly, the other pupils, Messrs. Sacchi, Tremlett, Prensziel, Welburn and Lieut. Low still keeping to the straight run and short flying stages. Day by day these have been practising regularly, Mr. Gordon Jones joining in on Thursday. On Friday the school was closed owing to the violent wind and rain.

Mr. G. Hamel made several flights to Windsor and back, and on Monday flew to Bushey Park, where he made some exhibition flights for the benefit of about 200 golfers who were present on the well-known golf course, and incidentally received some elementary hints in the art of the ancient game.

Grahame-White School.—Tuesday of last week tuition work commenced early by Mrs. Stocks, who, on the 60-h.p. E.N.V.-Farman, flew two circuits of the aerodrome, landing perfectly from a height of 60 feet, with the engine throttled down. Both Raphaite and Fowler indulged in a period of rolling practice. During the evening Mrs. Stocks flew several additional laps of the ground and Fowler rolled. The following morning the E.N.V.-Farman was again in commission, the lady pupil flying three circuits. Fowler, in rolling, misjudged his distance and charged full speed for the railings, which he only just managed to miss by putting the rudder hard over. It was really a lucky save, for the machine only suffered damage to the extent of one broken aileron lever. Both on Thursday morning and on Thursday evening the programme of the school operations was approximately the same, Mrs. Stocks still flying laps and Raphaite and Fowler rolling. On the following morning, Friday, Fowler was the first to take charge of the school machine, but in trundling across the ground he used his rudder much too fiercely, with the result that at a speed of about 45 miles an hour the machine performed a small circle in its own length. The finish was disastrous to the machine, the landing chassis being torn away, but the pupil happily suffered no injury whatever. A gale raged throughout the week-end, and unfortunately no flying could be undertaken. The Gnome-Blériot with which Hamel carried out the first delivery of aerial mails

was taken to the Festival of Empire on Saturday morning, where it is now on exhibition in the Australian building. On Monday evening Hamel left on his Gnome-Blériot at four o'clock for Bushey Hotel, near Watford, where, to the delight of the many visitors, he gave a remarkable exhibition, flying low and banking sharply above the tree tops. He left there at 5.30 for Hendon, and the return trip must have been exceptionally quick, for the mechanics that attended to his wants at Bushey, who were returning to the aerodrome on their car, met him half way along the main road going in the reverse direction towards Bushey on his car. At the school, Mrs. Stocks flew for ten minutes on Grahame-White's exhibition Gnome-Farman, to which machine she has been transferred on account of the excellent ability she has displayed on the school machine.

Portholme Aerodrome, Huntingdon.

ON Friday of last week some flying was seen at these grounds, when Mr. W. B. R. Moorhouse took the pilot's seat of his Gnome-Blériot for the first time. He got off in 20 yards, and flew four times round the drome at an average altitude of 200 feet, his aneroid in one instance registering 300 feet. He finished up with a very neat landing, not bumping in the least. His success speaks well for Mr. Moorhouse's future, as it was his first attempt with a Gnome-Blériot, and he had had but a very little previous practice with an old Anzani-Blériot, which was available last year. On Saturday it was raining and blowing a couple of gales lashed together, and flying was out of the question.

Salisbury Plain.

Air Battalion.—Owing to the members of the Air Battalion all being away except Captain Fulton and Lieut. Connor there is little to record for the past week's work. On Wednesday evening Captain Fulton and Lieut. Connor brought out a machine and after a preliminary circuit, in spite of a fairly stiff breeze, flew around the plains making some very sharp turns and descending with a fine spiral *vol plané*.



"Flight" Copyright.

STONEHENGE AS SEEN FROM A BRISTOL AEROPLANE.—This is, we believe, the first photograph of this ancient landmark as seen from above. It was secured at 5 a.m. by a member of FLIGHT staff when flying with Mr. C. P. Pizey on a Bristol biplane last week.

Thursday morning Lieut. Connor was out early scouting around Salisbury Plain in very treacherous winds, and in the evening he was out again putting in some real good work, and this time carrying a passenger.

Bristol School.—Monday of last week opened very fine in the morning, and pupils were able to resume solo flying; Captain Steele Hutcheson, Lieuts. Cross, Newall and Strover, and Mr. Lee (the Chinese Government pupil) each flying one circuit with perfect ease, while Lieut. Balder made two circuits in similar style. Pouring rain in the evening closed down the work for the rest of the day.

Another fine morning delighted the aviators on Tuesday. Flying was commenced by Busteed who took Jullerot as passenger to a point on the Plain, from which he observed the speed tests of the monoplane, which occupied some time. This was followed up by solo flying by the pupils. Captain Hutcheson made two circuits, as did Mr. Smith Barry; Lieuts. Strover and Balder each making one circuit. Lieut. Hooper, who recently joined the school, made his first solo successfully, and Mr. Lee and Lieut. Newall each proved his ability by making very neat "figure eights."

Captain Steele Hutcheson passed the tests for his certificate on Wednesday, showing perfect mastery of the machine. The evening was much too stormy for flying of any kind.

After a trial of weather conditions by Busteed on Thursday, Jullerot tested machine No. 43, which had been rebuilt at Filton from the ruins to which it was reduced when Pizey

was so unfortunate at Ventnor. It was found to be in perfect order. Lieut. Newall, of the Indian Army, passed his tests, flying remarkably well for three-quarters of an hour. Lieut. Strover flew one circuit on No. 12, but the breeze which had been steadily freshening all the morning suddenly developed into something approaching a cyclone, and abruptly terminated further work. In the evening Busteed and Jullerot both went up to test conditions, ascending to a height of 1,000 ft., and each finishing with a beautiful "spiral," right hand and left hand. Lieut. Cross and Messrs. Smith, Barry and Lee each did solos of 10 minutes' duration, and Lieut. Strover followed them up very closely by flying alone for eight minutes.

Next day, after making the usual trial, Jullerot carried Lieut. Newall, who secured a number of photographs of the surrounding country. Lieuts. Cross and Strover made two long flights, they being followed by Messrs. Smith, Barry and Lee. All these pupils are developing into exceptionally fine flyers, and should be quite ready to pass their tests as soon as opportunity offers. In the evening Captain Steele Hutcheson and Lieut. Newall went up for solo flights, each remaining up for a quarter of an hour, ascending to heights of from 600 to 800 ft., and both performing in remarkably good style. Jullerot made one very high flight on No. 43. Busteed following suit.

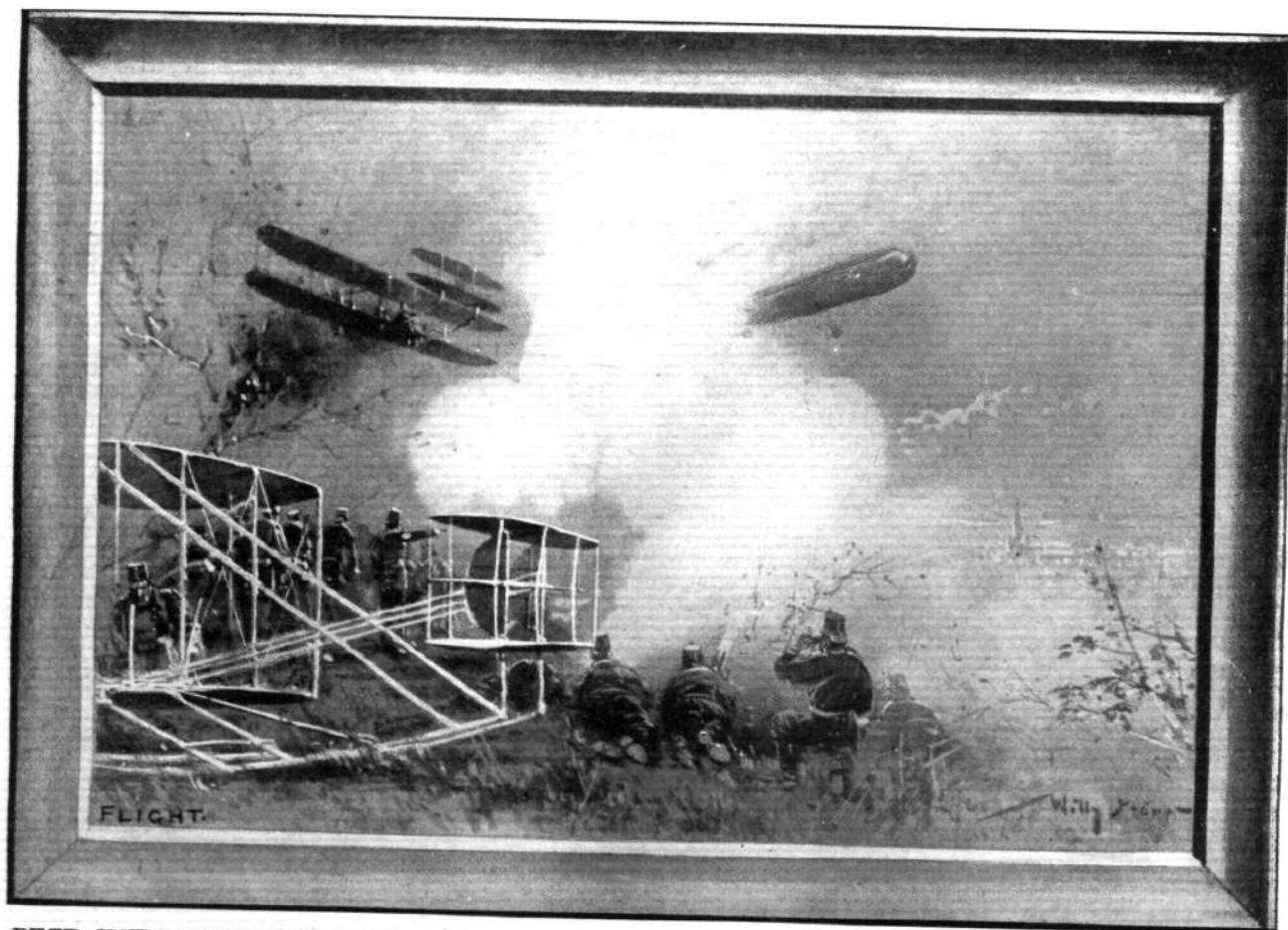
The wind was far too strong on Saturday to permit of any school work, it blowing a terrific gale the whole of the day.



Captain Englehart Fatally Injured..

ON Friday, owing to a disaster which accounted for the death of Captain Englehart, flying at the Johannisthal Meeting was stopped for the day. Piloting one of the German Wright machines, and carrying with him Herr Sedlemayr, another aviator, Englehart took the air at 3.21, in spite of a very treacherous and gusty wind. Flying low and finding the pockets very disconcerting, he rose to a height of 30 metres. At 4.26 it was noticed that something was wrong, and apparently one of the propellers had broken in somewhat similar manner to the accident which overtook Henn in the spring

of last year. The machine turned over and crashed down to the earth with its two occupants. Captain Englehart was apparently killed almost instantaneously, but Sedlemayr, his companion, was more fortunate, and was at once taken to hospital, where ultimately his injuries were found to be not of an extremely serious nature, and it is hoped he will at least survive. Captain Englehart was one of the finest, although very daring, pilots in Germany. He was the third certificated aviator, dating from March of last year, and was the chief pilot of the German Wright school, having given up his position as Aide-de-Camp to the Prince Imperial for the purpose of devoting his efforts to aviation.



A PEEP INTO THE POSSIBLE FUTURE.—An up-to-date method in Germany of advertising the German-built Wright flyers under the legend of "Wrights to the Front."

AIR EDDIES.

HENRI BRÉGI has undoubtedly had a much better time touring on his Breguet biplane in Morocco, where the natives have been prostrating themselves to the ground before his mechanical bird, than he would have had as a simple sapper in the French military manoeuvres. It is not generally known that the machine on which he has carried out these splendid flights is the same one as that used by de Montalant in breaking the world's record for altitude with a passenger at Brooklands some six weeks ago.

This intrepid aviator was acting as his own mechanic, and carried with him, in addition to a representative of the *Petit Journal*, a camping-out tent and a complete equipment of tools and engine spares. I have heard on good authority that Brégi is to be created a Chevalier of the Legion of Honour for his services in connection with this mission in Morocco. This, for one so young—he is only 23 years old—would be no small attainment.

Isn't it a relief to be able to take jam with your tea at the "Blue Bird," Brooklands, without that horde of wasps, which, throughout the summer, have been so persistent in inviting themselves to share your food?

M. Chanter, who has for some time had a flourishing flying school in operation at Hendon, is thinking of transferring his headquarters to the Shoreham Aerodrome. A monoplane, modelled upon Nieuport lines, which he has under construction, is nearing completion, and is really a thoroughly sound job.

The Morane-Borel combination, who are responsible for the production of that monoplane which bears the former's name, has suffered a split. Morane intends to form a new company with a capital of a million francs, and to embark on the construction of a new monoplane to the designs of Saulnier, who was formerly works manager to Blériot, and who, later, designed the Morane monoplane. Gabriel Borel will still continue manufacturing these machines, and they will still be known under their former style.

It is quite probable that by the time these lines appear in print, Breguet will have carried out tests with a magnified version of his standard biplane. This interesting machine, with which the inventor confidently expects to lift eight adult passengers, is equipped with a 130-h.p. Gnome engine—in reality, two seventies coupled together on the same crank case.

James G. Weir, of Glasgow, who was one of the first pupils of the Blériot School at Hendon, has given up aviation and disposed of his Gnome-Blériot to Salmat. It is, therefore, left to Ewen, a puerile Scot, with his headquarters up Lanark way, to bring his country to the front in aviation matters. By the way in which he flew at Edinburgh from a none too beautiful ground measuring 150 yards by 50 yards, and surrounded by obstacles varying from 10 ft. to 30 ft. high, it seems that he should not be long in getting "right there."

Not content with occupying his vacation in producing two new monoplanes, M. Louis Blériot has personally been carrying out tests on that unique inspiration of his—the "Canard." M. Norbert Chereau, who has just returned to London after spending a holiday at Hargrave with the famous constructor, tells me that the latter has made several flights on the new machine. This model has in a manner been constructed to satisfy a whim of Blériot's as to the practicability of the tail-first craft.

The graceful racing model which Blériot has also evolved as a holiday task is really wonderful in the matter of speed. In the hands of Alfred Leblanc it has attained a greater speed than those fearsome 100-h.p. Gnome-engined machines that represented France and the Maison Blériot in the Gordon-Bennett Cup race at Eastchurch. More noteworthy still! This terrific pace has been realised with a standard Gnome motor of 50-h.p.

Another unique machine, a creation of that well-known pioneer, Victor Tatin, has been undergoing tests at Louis Paulhan's flying

ground. "The flying porpoise," as this machine is known in the locality where these experiments are being made, has many points in common with that monoplane exhibited at the 1909 Exhibition at Olympia by the Petre brothers. The pilot sits in advance of the main wings, practically enclosed in the fusiform body. Directly behind him revolves the Gnome engine, which is coupled by means of a hollow universally-jointed shaft to the propeller at the extreme end of the tail. The wings have up-turned tips.

On Thursday last I called to see poor Hubert at St. Mary's Hospital, Paddington, to vary the monotony of his present dreary imprisonment. He, poor fellow, is very cheerful considering the pain he is yet suffering with his left leg, the veins of which have become inflamed. While it is likely that he will not be able to get about on his legs for another two and a-half months, he is none the less enthusiastic about aviation, and talks more than ever about going in for monoplaning. He has also an idea in the back of his head that he would like to transfer his activities to his native territory when he has fully recovered. Let us hope he will not be insistent in this idea, for his good flying and genial self would be much missed Hendon way.

Ewen, the cheerful aviator-organist of Lanark, who has done great things lately on his new 30-h.p. Anzani-Deperdussin, has his flying school in splendid running order. His two school machines are excellent, and both are capable of carrying the pupils through their certificate tests without that engine worry characteristic of the lower-powered air-cooled motors. Three of his pupils are in the circuit stage, and almost ready for the final examination of efficiency. It says something for his methods when so many southerners are going north to learn the gentle art.

A new Avro biplane has arrived at the firm's hangar at Brooklands, and it is on this machine that their chief pilot, Raynham, intends making an attack on the Michelin prize. This new biplane is practically identical with the school type, with the exception that it is equipped with a more powerful motor, a 60-h.p. Green. There promises to be a keen struggle for these honours between Cody, Raynham, and Kemp, the latter a former Avro pupil, who is now flying the Flanders monoplane. All the contestants are using the same power and make of motor, so the results will form a most interesting comparison of the relative efficiencies of the different machines.

News comes from North Carolina that the Wright Brothers have really succeeded in constructing a machine that will mechanically imitate the soaring motion of a bird's wing and derive its propulsive effort without the employment of rotary propellers. The famous brothers so startled the world with their early biplane that it is quite on the tapis that their innate genius has led them to fathom the more subtle mysteries of aerial navigation. Let us hope that the report is not analogous to the oft-recurring "bull" about Edison's storage battery.

If it's true won't poor Lucien Chauvière look glum? But I fancy he need hardly bother himself just yet awhile.

Mr. H. Barber, just back from a short holiday on the Continent, has returned with new inspirations in aeroplane construction, and has at present in hand the construction of a biplane which will possess many novel features. The pilot will sit behind the main plane in an approximately boat-shaped body at the rear end of which will be applied a flat non-lifting tail. The engine, a 50-h.p. Gnome mounted in front, will drive two tractors by means of chains running through tubular guides. As for the landing carriage, Mr. Barber promises an absolute departure from the general trend of chassis design.

I have heard that the worshippers at the picturesque church overlooking the Hendon Aerodrome have complained to the Home Secretary that the noises of the flying machines in the district on Sunday disturb their devotions. This seems rather a high-handed course to take, as undoubtedly if they had applied to the aviators themselves, these latter, for the most part generously-disposed persons, would no doubt have accommodated them by refraining from flying during the hours of divine worship.

"OISEAU BLEU."

SCIENCE AND THE AERONAUTICAL ENGINEER.*

By L. BERN. DESBLEDS.

THERE is a general tendency, which has found expression in certain aeronautical organs, to believe that since the aeroplane has been able to attain a certain development without the application of laboratory results and without an adequate knowledge of the theory of mechanical flight that the science of aviation does not require for its full expansion a complete theoretical knowledge of the different factors which influence it. Not only is it thought by some that a true insight of the different problems connected with aerial travelling can only be acquired by actual practice, but also that any theoretical study of the subject cannot in any way assist the new science. In view of the magnificent performances of some aviators who do not possess any scientific training we hear it proclaimed every day that aviation has been created by practical men and that it can be only developed by them; let it be said, however, that all those who have a really scientific training and who have studied the development of any branch of science have not been dazzled by the magnificent flights that have been performed in the last few months, but, on the contrary, have seen in them the necessity for methodical and scientific research.

The need of experimental data, obtained with a true scientific spirit, has already been strongly felt by those who are anxious to evolve, out of the existing machines, stronger and safer air-craft.

If sensational records have been broken over and over again within the last few months, the aeroplanes themselves have not been very materially improved as regards their stability in wind eddies or as regards the safety of landing.

A theoretical knowledge based on accurate experimental data is indispensable to any aeronautical engineer as distinguished from an aviator. M. R. Esnault-Pelterie, the designer of the R.E.P. aeroplanes has himself stated that, in his experiments with his aeroplanes, he lost quite a year for having ignored a principle which is now clearly established, namely that of the backward motion of the centre of pressure of a curved surface as its inclination diminishes.

Aeronautical laboratories now exist in every country taking real interest in the possibilities of the flying-machine as a powerful weapon of war and as an industry. The best known are those of Chalais-Mendon and of the Eiffel Tower in France, of the National Physical Laboratory in this country, of Kutchino in Russia, of Göttingen in Germany, and the military laboratory of the Brigata specialist in Italy. Important results have been obtained in those well-equipped laboratories quite recently and, in our lectures, we shall classify and examine the most important of them and see how to apply them to solve some of the numerous problems that face the aeronautical engineer.

We shall particularly study the magnificent results obtained by Eiffel in the laboratory he has erected at the foot of the tower bearing his name, as well as those recently obtained by Prandtl at the laboratory of Göttingen, and we propose to devote a few evenings to the examination of those results which are sure to come to light before the end of the present session.

The remarkable volume which has been published by Eiffel quite recently, and which contains the results of his researches, and some most important conclusions to be drawn from them, is no idle excursion in the realms of mathematical probabilities, but a treasure of practical information gathered from a large number of results co-ordinated with all mastery of modern scientific methods. It is now possible to design aeroplanes with fair accuracy; the time for guess work is passed, and the sooner this is realised the better.

The able manner in which the minutest details were studied and carried out leaves little doubt as to the trustworthiness of these experiments, and the results receive confirmation from those obtained by Mr. Staunton at the National Laboratory. Of all the facts established by these experiments, few can be more important than the simple relation which holds between aeroplanes of different sizes. The behaviour of a large or full-sized aeroplane can be deduced from the results of experiments on a small size model, by the use of a simple coefficient. Thus, what has long been done in the ship-building industry can also be done in the case of air-craft.

The behaviour of surfaces at various inclinations to the direction of the wind or of travel has received extensive

treatment. The pressure in the direction of travel or the resistance to travel, the pressure at right angles to that direction or the sustentation, the total pressure, and the distribution of pressure on both sides of the surface have all been accurately measured. Results obtained by a balance method have been strikingly confirmed by the summation of local pressures on both sides obtained by means of manometers.

The results have been embodied in a set of curves which it is essential to study carefully in order to arrive at an intelligent understanding of this intricate question. The interest attaching to a peak of high pressure in all these curves, is only surpassed by that attaching to the remarkable sustentation of curved surfaces, and their peculiarly unstable behaviour at small inclinations, especially at small negative inclinations. The suggestion that this may have been the cause of many accidents otherwise unaccounted for deserves serious consideration, and shows how valuable such investigations are, and how essential it is that all concerned should make themselves thoroughly acquainted with the results.

A polar curve has been ingeniously devised from which the following quantities can be read out at a glance, namely: The resistance to travel or horizontal component of the pressure as abscissa, the sustentation or vertical component of the pressure as ordinate, the resultant or total pressure as a radius vector, the inclination of this resultant, the inclination of the surface, and the position of least resistance.

The distribution of pressures on both sides of the surface has also been represented by curves. It is worth noting that the negative pressure at the top of the plate, especially near the leading edge, is considerably larger than the positive pressure on the lower side of the surface. This fact is most important from a constructional point of view. It means that the canvas which covers the upper part of an aeroplane should be strongly fixed to the framework of the aeroplane and that its leading edge should be protected from the strong suction of this negative pressure. The position of the resultant centre of pressure also forms the subject of an interesting set of curves.

Besides flat surfaces, and surfaces having one curvature only as commonly used, surfaces having two curvatures have also been experimented upon, and have been found to possess the striking property of offering a decreasing instead of an increasing resistance at higher speeds.

The experiments have not been confined to surfaces of a few simple geometric forms, but have included small models of most of the aeroplanes in actual flying machines. All these were made 90 cm. \times 15 cm. The results obtained with these, after being converted by the use of a coefficient ratio to make them apply to the full-sized aeroplanes, were compared and found to agree with the actual data obtained from the flights of the full-sized machines.

It had been usually accepted or assumed that for small angles of inclination ranging from the angle which gives zero sustentation to angle of about 8° , the total pressure was proportional to the inclination. This is now proved to be incorrect in the case of Wright aeroplanes. For small angles up to 2° the rate of increase of the pressure for these aeroplanes diminishes gradually; it is only between 2° and 8° that the rate of increase is practically constant. Beyond 8° the rate of increase diminishes again.

An important factor from a practical point of view is the ratio of the horizontal component to the vertical component of the pressure, i.e., of the resistance to the sustentation. This factor also has been represented by curves. For the Wright aeroplanes the minimum value of this ratio occurs at 2° . For smaller angles the ratio increases rapidly, while for angles up to 8° the ratio increases but slightly; for larger angles the ratio again increases rapidly. It must be remarked that the angle for which this ratio is a minimum is not necessarily the best angle, for the sustentation may then be inconveniently small for the area of the surface, and it may be advantageous to sacrifice a small increase in the proportion of resistance to sustentation for the sake of a notable increase in sustentation for a given area; thus in the above case, an angle of 6° or even 8° may be found more suitable. These are only a few examples of the value of laboratory researches and of their practical usefulness. It is only on sound data that we can build up the new science of aeronautics and such a technology as is indispensable for the full and rapid development of the new branch of engineering.

* From the opening remarks of the lecturer at the beginning of the winter session of the Aeronautical Course at the Regent Street Polytechnic.

BRISTOL FLYING SCHOOL.

LAST month we gave a summary of the previous month's work got through at the Bristol schools, and as showing the steady progress being made it made interesting reading. The *resumé* which we now publish up to September 30th is no less instructive. From August 26th till September 30th the following pupils passed the tests for their aviators' certificates:—

Name.	School.	Date of		Time occupied.
		Joining.	Passing.	
Lieut. Clarke Hall, R.N.	Salisbury...	Aug. 19	Aug. 26	1 0
Mr. S. P. Cockerell	"	" 14	Sept. 1	2 4
Mr. E. Harrison (Victoria)	"	" 4	" 1	4 0
Mr. W. E. Gibson	"	" 7	" 1	3 4
Naval Cadet R. F. Wheeler	"	" 8	" 9	4 4
Mr. J. Brereton	Brooklands	May 14	" 12	4 0*
Lieut. Wyness Stuart (R.F.A.)	Salisbury...	July 4	" 25	5 2†
Capt. F. W. Richey...	Brooklands	Sept. 4	" 25	3 0
Capt. Steele Hutcheson	Salisbury...	" 1	" 27	3 5
Lieut. C. N. L. Newall	(Indian Army)	Aug. 21	" 28	3 3‡

* Was away for about three months during the period mentioned.

† Was away for about three weeks between the dates mentioned.

‡ This officer's tuition was interrupted for about two weeks.

Total certificates for the month, 10; average time occupied, 3 weeks 3 days.

It should be borne in mind that in many cases the pupils might have passed their tests sooner, but were purposely held back from doing so until they had had ample opportunities for practice. The same remark applies to the thirteen pupils still under instruction, most of whom are quite ready to pass their tests but are being thoroughly instructed in every branch of the science before they do so. These gentlemen are:—

Mr. O. S. Mellersh	Lieut. Balder, R.N.	Lieut. E. G. K. Cross
Mr. H. H. Slater	Lieut. Joseph, R.N.	Lieut. A. F. A. Hooper
Mr. E. Pitman	Lieut. R. J. Watts	Major R. L. Benwell
Mr. L. E. Petavel	Lieut. E. J. Strover	
Mr. R. Smith Barry	Mr. Z. Y. Lee (Chinese Government pupil)	

It will be seen that of the ten pupils who passed their tests during the month, six were officers of the Services, and that of the thirteen still remaining under instruction, no fewer than seven are officers of either the Navy or the Army.

The result of the month's work is distinctly satisfactory, especially as the weather was more unsettled than that of the preceding month, with the result that flying was not possible so often.

It is very gratifying to find so many Service officers taking such a keen interest in aviation as to take tuition at their own expense, and the Bristol Company has every reason to congratulate itself upon the success which has attended its progressive policy in tuition methods, as evidenced by the efficient equipment, expert instructional staff and the thorough organisation which are to be found at the flying schools at Salisbury Plain and Brooklands.

THE WRIGHT BROS. AND THEIR EXPERIMENTS.

WILBUR WRIGHT and his brother have, it appears, gone off to their North Carolina sand dunes again, there to experiment for what purpose it may safely be said that no one beyond their immediate entourage is accurately aware. According to the cabled reports, they would appear to be engaged in a flapping wing machine of sorts, and to be paying particular attention to the art of soaring as differentiated from the art of gliding, with which they began their practical experiments in flight.

As usual in such matters, there are vague rumours of flying without mechanical power, which, in the way it is generally expressed, is sheer nonsense. Observations of bird flight indicate that certain soaring species exercise very little muscular energy even though they may remain aloft for hours, but it is equally well known that this erstwhile mystery finds its solution in what Langley described as "the internal work of the wind." Where there are pulsations in the atmosphere or air currents with an upward trend, it is possible to extract energy from the motion of this invisible sea. If

the energy is adequate, it will support an aeroplane, and extended flight would be possible so long as the essential conditions prevailed.

Meteorology teaches us that the air is never still, and that no wind is uniform, hence the plausibility of soaring flight has at least so much support; but is the evidence of a universally soarable atmosphere adequate to support the notion that soaring flight could take place anywhere and at any time? Remember, soaring birds are only really common in certain places, and remember also that all birds that soar have at least the latent power to flap their wings, in other words, to fly. Those who are reading the particularly interesting and instructive articles on bird flight by Dr. Hankin will find a mine of information on this very question of soarability of the atmosphere, and if indeed the Wright Brothers are experimenting along these lines, then this series seems singularly opportune, for there is no doubt it forms the most complete study of bird habits in the air that has yet been written.

JOHANNISTHAL FLYING WEEK.

ENTHUSIASM at the work put in by the aviators day by day at the meeting on Tuesday of last week in no way abated. The visitors were well rewarded, as although a very dangerous wind was driving, several of the aviators executed some splendid flights. The longest was by Herr Witte, who was up for 1 hr. 23 mins. on an old Wright machine fitted with an ancient 35-h.p. motor. At the finish motor complications compelled him to land; and it was perhaps by a stroke of fortune that this was so, as after coming down it was discovered that one of the planes was broken. At times his banking was alarming, even if the machine had been one of the latest type. Capt. Englehart, on his "Baby" Wright, did not remain up more than 13 mins., but Herr Hoffmann, on a 100-h.p. Harlan monoplane, fought against the elements for 1 hr. 5 mins., when he descended owing to a slackened wire. Pietscher made a steady flight, climbing to about 250 metres, whilst Miss Beese contented herself with travelling with Herr Hirth as passenger. The public attendance was greater than ever on Wednesday of last week, although the flying was not so remarkable as on the previous day. Miss Beese was a leader, flying for 2 hrs. 21 mins., Capt. Englehart putting up some fine performances on his German-built Baby Wright aeroplane fitted with a Daimler motor. The long-distance flyers were all in keen competition again, Suvelack, Hoffmann, Pietscher, Jahnou, and Miss Beese being all within close figures at the finish. The number of machines at times in the air was quite startling, and once

or twice something near a scrape was feared, one of the aeroplanes—Miss Beese's—just missing collision with the Parseval airship, which was cruising above, whilst Capt. Englehart and Suvelack had a narrow squeak when passing each other. During the day Prince Sigmund of Prussia was an interested spectator of the flying, whilst General von Heering-n, the Minister of War, was also a close attendant. Some remarkable evolutions were carried out for Prince Sigmund's special delectation by Hirth on a 120-h.p. Daimler-Tauber monoplane and Jeannin on a 100-h.p. Aviatik. Thursday almost a tempest was blowing, and rain pouring down in torrents at times. Witte put in a flight of 1 hr. 23 mins.; Hoffman, 1 hr. 5 mins.; Suvelack, 57 mins.; Pietscher, 1 hr. 6 mins.; Schauenburg, 49 mins.; and Capt. Englehart, 47 mins. Miss Beese was very popular, carrying a passenger several circuits of the aerodrome.

Saturday a complete change came over the weather, and some excellent flights were put in during the day. Hirth, with Miss Beese as passenger, created a new German altitude record with 2,475 metres, being up for 30 mins. This record hitherto has stood to the credit of Schoendel with 1,680 metres, he, it will be remembered, coming to a tragic end at the finish of his essay. Pietscher, with two passengers, was flying for 2h. 19m., another German record, whilst Witte was in the air for 2h. 10m., Grublich 1h. 34m., Schwandt 1h. 26m., and Oerlich 1h. 16m.

THE FRENCH MILITARY COMPETITIONS.



THE FRENCH MILITARY AEROPLANE COMPETITION.—General view of the aeroplane sheds and aerodrome at Rheims, which is the centre for this important French War Office competition.

ON Sunday last the formal commencement of these very important trials was inaugurated by the arrival, under the guidance of General Roques, of the special commission appointed to deal with the machines submitted. The wind, as if in protest against such a competition to master it, was about the most violent that had been experienced at Rheims—the scene of the operations—almost in the memory of man, and it was necessary, therefore, for the inspection operations to be confined entirely to the sheds. This occupied a considerable number of hours, and ultimately 31 machines, which complied with the specified regulations, were accepted for the eliminatory tests imposed by the French War Office. These were the work of 14 constructors and 11 manufacturers of motors. Only three machines presented were not in order, one of these being an Astra, to which the wheels were not fixed, and in the case of a Nieuport, the wings were not in place. Whether these will be admitted later remains to be seen. Sommer is absent from the list it will be noticed. In bringing his machine by road to Rheims they encountered a violent storm *en route*, which caused considerable damage, and it was hopeless for him to attempt to get them in presentable order in time to pass the Commission. It is regrettable from both sides, as these machines have proved themselves of such splendid service in their work. After weighing and sealing operations, the actual trials themselves will commence, and will be continued until the end of the present month, when the awards will



The Quentin-Bauchart Prize.

AFTER weeks of almost continuous rivalry this prize, which closed on Saturday last, was determined in favour of M. Renaux, who, on his Renault engine Maurice-Farman biplane, had totalled up no less than 6,600 kiloms. to his credit for this competition, Helen being second on his Gnome-Nieuport with 5,300 kiloms. The several other competitors who were in the running at all were considerably behind these two leaders. Gibert on his Rep-R.E.P., Vedrines on his Gnome-Morane, and Tabuteau on another Gnome-Morane being nearer the 3,000 kiloms. each. The official figures are not at present available. During the week each of the leaders had put in flights at every available opportunity. Renaux on Wednesday added 200 kiloms., the next day flying from Buc to Rheims in 2½ hours, whence he returned by train to Paris, and made a further addition over the Etampes-Gidy course, covering about 300 kiloms. before mid-day. Thursday saw him carrying a passenger on the Ville-Sauvage-Giry course for another 800 kiloms., Friday accounting for another 500 kiloms., the final flight on Saturday, when the weather was of a very stormy character, resulting in putting Renaux and his Maurice-Farman machine at the

be made upon the results, each machine having to go through a series of tests, including specified cross-country flights, carrying useful loads of such a weight as to be of real service to the commanding officers in the case of actual hostilities. The full rules governing this competition appeared in FLIGHT, November 12, 1910. The machines accepted as complying with the requirements were as follows:—

Aster-Wright (40-h.p. Bariquand Marre)	H. Farman (100-h.p. Gnome)*
Borel Morane (100-h.p. Gnome)	M. Farman (70-h.p. Renault)*
Hanrio (100-h.p. Clerget)*	Savary (70-h.p. Labor)*
H. Farman (70-h.p. Renault)*	Voisin (140-h.p. Gnome)*
Aviatik (100-h.p. Rossel)*	Voisin (70-h.p. Gnome)*
Paulhan (70 h.p. Renault)	Voisin (100-h.p. Gnome)*
Blériot (140-h.p. Gnome)*	Antoinette (60-h.p. Antoinette)*
Blériot (100 h.p. Gnome)	Coanda (70 h.p. Gnome)*
Breguet (70 h.p. Gnome)	Goupy (100-h.p. Gnome)*
Breguet (140-h.p. Gnome)*	Goupy (70-h.p. Chenu)*
Breguet (80-h.p. Canton Unne)	Astra (70-h.p. Renault)
Breguet (110-h.p. Dansette)	Astra (70 h.p. Chenu)
Breguet (75-h.p. Chenu)*	Deperdussin (100-h.p. Gnome)
Breguet (110-h.p. Canton Unne)	Deperdussin (100-h.p. Clerget)
H. Farman (70-h.p. Gnome)	Deperdussin (80-h.p. Anzani)
H. Farman (70-h.p. Renault)*	Nieuport (100-h.p. Gnome)*

* Chauvière propeller.

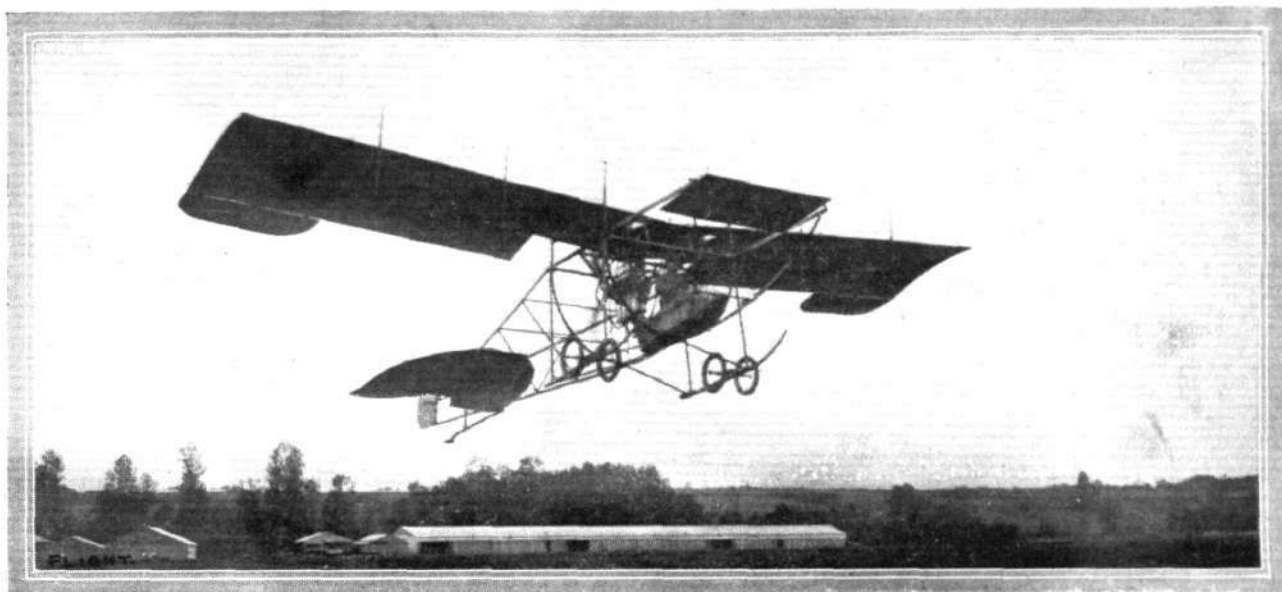


head of the list. Carrying on this day a passenger over the Etampes-Vincennes and Gidy course, he added 300 kiloms. to his total, bringing it approximately to the figures already given.

Helen on Tuesday covered 300 kiloms., and was again at work the next day, getting 500 kiloms. to his credit, the Thursday accounting for another 450. Friday he selected the Issy-Etampes route, and making six trips alone and two with a passenger, he added 850 kiloms. to his score. The final day, starting from Issy, with Charles Nieuport as passenger, he put up 150 kiloms., and then finished off, the terrible weather upsetting all calculations both of Helen and Renaux for hugely increasing their total on this, the final day. Helen used the same Nieuport machine throughout the contest, after having put in about 1,500 kiloms. in preliminary practice.

Gibert, on Wednesday, in two flights between Buc and Etampes, added 450 kiloms. to his total, whilst Tabuteau and Vedrines, both feeling that they were out of the running, made little effort to overtake their more fortunate rivals, beyond a flight by the latter from Chantilly to Issy, although before the Saturday he had managed to increase his total to somewhere round about 3,400 kiloms.

FOREIGN AVIATION NEWS.



THE GASSIER MONOPLANE AT JUVISY.—A number of interesting points are embodied in the design of this machine, which has a rear elevator as well as a forward one, while the main planes are fitted with ailerons in addition. It will be noticed, too, that the spars of the main plane are very strongly trussed. The engine is a 70-h.p. Gregoire.

French Aero-nautic Salon.

THE date for this year's Aeronautic Salon has been now definitely fixed. The opening will be on December 16th next, and it will remain open until January 2nd, the Grand Palais being of course where it will be held. Already much more space has been taken up than at the previous two exhibitions, some 40 machines having already been provided for, against 21 in the 1909 Salon, and 37 in 1910.

Venice to Trieste.

WIDMER on a Blériot-Gnome monoplane on Sunday, September 24th, made a successful flight from Venice across the Adriatic Sea to Trieste. Starting at five minutes past five from Venice, he landed successfully at twenty minutes past six, being most enthusiastically received by an expectant crowd.

100,000 Francs for French Aeronautics.

AN anonymous donor has come forward in France and made an offer to the President of the A.G.Ae. of 100,000 francs in support

of military aviation in France, in view of the splendid results of the recent manoeuvres. A condition attached to it is that by means of a patriotic subscription list this amount shall be raised to 1,000,000 francs. The A.G.Ae. have accepted the undertaking, and are very sanguine of obtaining the balance, in view of its national character.

Another Eight Blériots for the French Army.

By way of contrast to the ridiculous, although very serious, attitude towards aviation taken by our own Government, the French authorities are increasing their rate of acquiring aeroplanes rather than the reverse. Last week eight more Blériots of type XI were taken over in one batch, after their having been put through their paces under the superintendence of Alfred Leblanc.

One Hour Against the Wind, 18 Minutes With.

AT Etampes on Sunday last, Lieut. de Briey when qualifying for his military *brevet* on a Deperdussin machine on the Etampes-



THE FRENCH MILITARY AEROPLANE COMPETITION.—General Roques, Inspector-General of military aeronautics, conducting the members of the special Government Commission round the Aviation grounds at Rheims, where the military competitions started on Sunday last.



A souvenir from Henri Bregi, dated from Rabat, Morocco, where he arrived with his Breguet triplane recently, and remained for about five days owing to the violent sand-storms.

such an apparatus should prove of vital importance to the generals in command of opposing armies by way of corroborating what their officers may have observed with the naked eye.

A Cross-Country Flight in Holland.

WYNMAELEN, last week, on a Gnome-engined Deperdussin monoplane, made a flight from Leyden to Amsterdam at an average speed of 150 k.p.h., being received with a mighty ovation at the end of his voyage.

Aeroplanes for the Dutch Government.

THREE aeroplanes are to be acquired by the Dutch authorities for use in the home army, and six others are to be shipped out to the East Indies for the same purpose. At the recent Dutch manoeuvres, Van Meel, accompanied by Van Heyst, was daily reconnoitring on one of the Henry Farman machines, and thereby was able to obtain the most minute information as to the movements of the enemy's troops. On one day last week he made a scouting flight, which enabled him to report upon the distribution of the troops within 50 kiloms. of the camps.

Labourchere has also put in further work with one of the latest types of Zodiac biplane. In one reconnaissance he passed by way of Bois le Duc, Rhenan, and Amerongen, about 100 kiloms., covering the distance in 1 hr. 7 mins.

Chartres course, ailed by a violent head wind, made the outward journey in the hour, and for the return took 18 mins. with the following wind.

Buc to Rheims.

BARRA, last week, on a Renault-engined Maurice Farman, in spite of an adverse wind, flew from Buc to Rheims in 2 hrs. 15 mins.

Legagneux Flying over Lake Lugano.

ON Thursday last week a splendid trip was made by Legagneux over Lake Lugano and the adjacent mountains. He climbed to about 1,700 metres, and circled over the snow-covered mountains in the distance.

Maurice Farman Carries His Brother Dick.

ON Thursday last week Maurice Farman, at Buc, after giving M. Edmond Lefebvre his first air trip, took up his brother Dick, flying with him to Rambouillet. During the day Lieut. Varsin, on a Farman, was added to the list of holders of the superior military brevet.

Cinematographs for Air Scouts.

BY way of experiment, the German War Office have decided to obtain panoramic pictures of *terra firma* from an aeroplane by means of cinematograph cameras. Such excellent results have already been obtained in this direction that there is little doubt that

An Aero Club President takes his Brevet.

MR. ALBERT B. LAMBERT, the President of the Aero Club of Saint Louis, U.S.A., can now claim to be the first man in that position to have secured his pilot aviator's certificate. After careful tuition from Walter Brookins, of the Pioneer Aviation Co., he has secured his license from the Aero Club of America on a Wright biplane at the Kinloch Aerodrome.

Two-Passenger Record in America.

AT the Long Island Aerodrome, Lieut. Willing on a Burgess-Wright biplane, carrying two passengers, is credited with the American record of 1h. 54m. 42s.

A Proposed Minneapolis to New Orleans Flight.

IN the United States it is proposed to hold a hydro-aeroplane competition between the two cities named above, a purse of about \$30,000 being put up as an inducement. Hugh Robinson, it is stated, has already undertaken to attempt the flight in a Curtiss machine.

A Gnome on a Burgess-Wright.

AT the Burgess Co. and Curtiss works a Wright type biplane is being fitted with a Gnome motor, this being the first of this type of machine to be so equipped. Considerable changes have been made by the firm in the structure of the biplane to enable this to be done, and it should be interesting to watch the result under the changed conditions. Mr. T. O. M. Sopwith will, it is stated, fly the machine.

CORRESPONDENCE.

* * * The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which they have read in FLIGHT, would much facilitate ready reference by quoting the number of each such letter.

Suggested Improvement in the Operation of Balancing Flaps.

[1378] I should welcome a discussion in your correspondence columns on the following suggestion:—

I propose that ailerons should be operated in exactly the opposite way to that at present adopted—that is, they should be pulled up instead of down. Of course, by this arrangement, the opposite aileron would be employed to that at present used for any particular manoeuvre.

The advantages obtained by this alteration are probably:—

(1) In banking during a turn, the drag necessarily following the use of a balancer will decrease the speed of the wing on the inner side of the curve, which naturally moves slower than the other wing, as the balancer will be used to depress the inside wing. This will probably minimise the effect of slackening speed at present felt, and should, I think, make up for any loss of height consequent on forcibly lowering the wing.

(2) In correcting this banking, the aileron used will be the one on the outside of the curve, which is moving faster than usual, and which will therefore have the advantage of being used while at its maximum efficiency.

As the action of depressing will be applied behind the centre of pressure, it is possible that some connection with the elevator will be necessary for the satisfactory working of this device.

Nottingham.

SIDNEY A. NEWTON.

Aeroplanes in Warfare.

[1379] I must apologise for a slip in letter 1355. Ranging from aeroplane to air-ship, or to another aeroplane, if it is possible or necessary, would no doubt be done by one of the one-man range-finders in common use, such as the Barr-Stroud. Probably the vibration would make it very difficult.

The problem of the use of aeroplanes in war is a very big one, and could only be worthily handled by a conference of naval and military officers and competent constructors. France is much ahead of us, and probably Germany too, though she is very quiet on the subject, because in a "nation in arms" practical soldiery is understood and proper supplies are voted for the necessary services.

With our unworthy system of makeshift and meanness, anything pertaining to the defence of the country is the last thing thought of by the voter or his demagogic leader.

No doubt many crude ideas, which are bound to be failures, will be put forward from time to time, but eventually it is to be hoped that order will be evolved from chaos, and we shall go ahead.

Mr. Atkinson will find the rough rules referred to in the publication quoted in letter 1355. I should recommend him to read both French and German military periodicals if he wishes really to go into the subject.

By the way, it would surely be well within the power of a skilled pilot to swoop down on an airship from a position higher and astern, cutting out his engine to reduce speed when necessary.

May I express my hearty admiration of Dr. Hankin's excellent work!

Hampstead Norris.

R. A. (Retired).

A Clever Wire Fastener.

[1380] Some time ago a correspondent was asking in FLIGHT for the English maker of wire ferrules similar to those used on the French machines. I beg to inform you that we have made these for some time, and hold a stock of same, although they do not appear in our catalogue.

This may be of service for any future inquiries you may receive.

PFEIL AND CO.

145 to 157, St. John Street, Clerkenwell, E.C.

[A sketch of the fastener referred to appears on page 470, FLIGHT, May 27th, 1911.—ED.]

The Aerial Post.

[1381] In reference to a letter from one of your correspondents who signs himself "Remous" (1371), there appears to be a very startling similarity between his opinion of the Aerial Post and that of a contemporary.

"Remous" says that if the lay press would fill its columns with accounts of *cross-country flights*, instead of terrible accidents to aviators, the public would be much better impressed.

Surely Hendon to Windsor and back is a cross-country flight. Also, why should Messrs. Hamel, Greswell, Hubert and Driver have made better flights elsewhere? Why elsewhere? If, as your correspondent states, there is nothing remarkable in an aeroplane flying 20 miles with a few pounds of letters strapped on the machine, why not regard these flights as point-to-point cross-country flights pure and simple? Not so very long ago a flight from Hendon to Brooklands would have been considered a very important event, so why anyone should sneer at flights equal to this and far more often repeated I really cannot understand.

I, myself, have my own views concerning the First Aerial Post, but I really think a great deal of unnecessary fuss has been made over the affair, a lot of which has been quite uncalled for.

Earl's Court.

BOIS-CASSÉ.

Re Classification of Aeroplanes.

[1382] In last week's FLIGHT I notice Mr. D. Allon Pitt (No. 1,370) refers to Mr. E. W. Twining's type formula, and mentions that he has not heard of this method of tabulating types of machines being used.

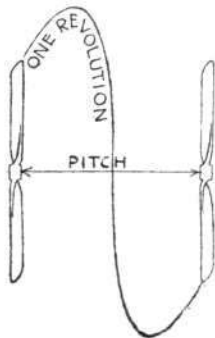
If Mr. Pitt will refer to R. W. A. Brewer's "Art of Aviation," he will find therein a table of "Aeroplanes of 1910," containing particulars and dimensions of 66 aeroplanes, to each of which Mr. Twining's formula has been applied.

With regard to the difficulties of new readers in understanding the formula, there surely must be new readers of locomotive magazines who at first fail to comprehend the formula as applied to locomotives, but who, in the course of time, understand its meaning. The same will apply to aeronautical students.

FREDK. THOS. NETTLEINGHAM.

What is?

Pitch. Pitch is the term describing the distance that a screw is supposed to advance in one revolution. It may be calculated from the angle of the blade, in which case it is the theoretical pitch, or the flight velocity of the machine may be measured simultaneously with the revolutions and the effective pitch deduced therefrom. Owing to slip the effective pitch is less than the theoretical pitch, in other words the machine advances a shorter distance per revolution of the screw than would be the case were the propeller in reality a nut working on the solid thread of a bolt.



MODELS.

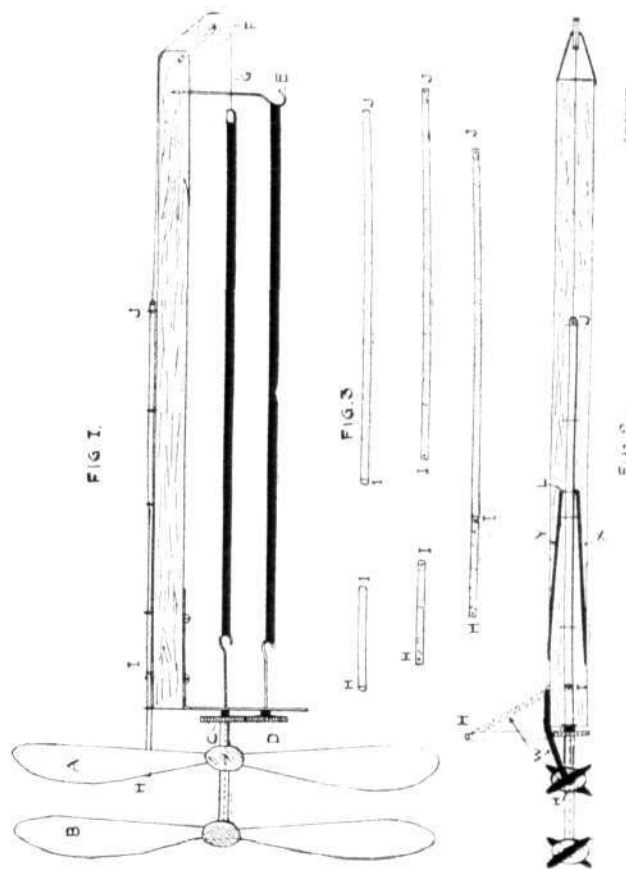
Elastic Motors.

[1383] I recently constructed a continuous-drive elastic motor of my own invention, and I am venturing to enclose a description that may be of interest to your readers.

Figs. 1 and 2 show the side and plan elevations of the finished motor, from which it will be seen that both propellers are driven on the same spindle, as in Mr. Aston's "Wild Cat" model, but the propellers are both of the same pitch and diameter, and revolve one after the other in the same direction.

A and B are the two similar propellers, and C and D the gear-wheels driving them. I do not think the gearing requires any explanation.

The elastic driving D is anchored on the hook, E, but the elastic driving C is attached to the fine wire, G, which passes round the



pulley, F, and thence over the spar, where it is anchored to the piece of aluminium or magnalium tubing, H, I, J, which is shown separately in Fig. 3.

This is made out of two pieces of small diameter tubing, flattened and bored at the ends, H, I and J. It is then joined at I by a small pin so as to make a hinge.

Its position on the spar is shown in Fig. 2. Two pieces of elastic, X and Y, are attached to it at L, and anchored to the spar. Another piece of elastic, W, is attached to the hinged arm, and anchored to the side of the spar.

The action is as follows:—Both the propellers are wound up a certain number of times. The propeller, A, is prevented from revolving by the arm, H, but the propeller, B, revolves.

As the elastic, driving B, slackens, the elastic, X and Y, draws the arm, H I J, along the spar. The wire, G, is so adjusted that when the propeller, B, is almost wound out, the hinge, at I, has arrived at the end of the spar, and the arm, H I, is pulled through an angle of 90° into the dotted position shown in Fig. 2, and so releases the propeller, A, which then revolves.

Care should be taken that the arm, H I, is not too long or it will interfere with the propeller, B.

Wellingborough.

C. M. NEWTON.

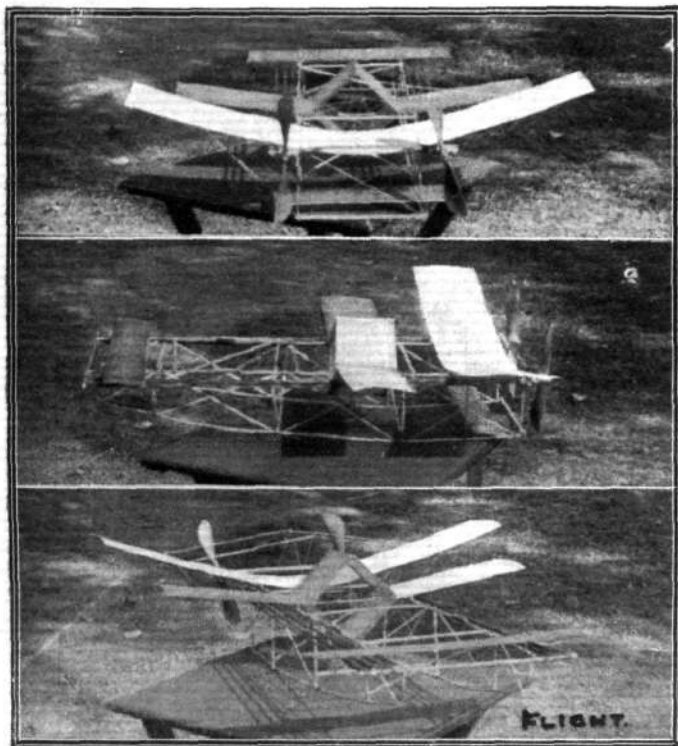
Naturally Stable Model.

[1384] I have for some time been experimenting with a view to producing a model of a man-carrying flyer that really possessed faultless and immediate natural stability at a slow speed, even in a strong and gusty wind.

I enclose photos of the experimental model which has proved itself to possess this stability invariably.

Its normal flight is 250 yards in 40 secs. The central plane, to the shape of which I attribute the wonderful lateral stability, is situated just over the centre of gravity.

The diamond-shaped box plane is, of course, nothing new, having been applied to kites for years as the feature of their stability; the



wonder is that no aviator—so far as I know—has tried it on a large flyer. It is fitted with two adjustable longitudinal stabilizers, right forward and at the rear large plane.

I append details in case you care to publish them:—Length of frame, 33 ins.; width of frame, 8 ins.; material, $\frac{1}{8}$ in. hickory; rear plane (pino wire and silk), 33 ins. by $5\frac{1}{2}$ ins.; centre plane (steel and aluminium ribbing), 27 ins. by $4\frac{1}{2}$ ins.; diamond box plane, 7 ins. across; forward stabilizing plane, 18 ins. by 3 ins.; rear stabilizing plane, 12 ins. by $2\frac{1}{2}$ ins.; all planes cambered; twin propellers, 9 ins. “aerospeeds,” each driven by $1\frac{1}{4}$ ozs of elastic, divided into three separate skeins for each propeller by means of Melcomb’s triple intergearing, giving 850 turns for each propeller; total weight of model all on, $12\frac{1}{2}$ ozs.

Downham Market.

(REV.) HAROLD KELK.

The Limit of Long-Distance Flyers Propelled by Elastic.

[1385] In his letter entitled “The Limit of Long-Distance Flyers Propelled by Elastic,” Mr. G. T. R. Hill, who is of course well known in connection with model flying, would seem to make an attack on the use of rubber as a motive power for models. Moreover, he describes all machines driven by elastic as “flying sticks,” a term which has hitherto been solely applied to models designed for the sole object of winning competitions, without any consideration of symmetrical and rational design.

Mr. Hill seriously states at the outset of his letter that the power of a thick rubber motor is not necessarily greater than that of one containing a smaller number of strands. Has he ever tested, by means of a dynamometer, the contrast between the power of six and twelve strands of $\frac{1}{4}$ in. strip rubber used on 30 in. fuselages? Of course, whether this extra power is used efficiently is beside the point, but the fact remains that it is there, and, if wasted, reflects little credit on the designer.

Does Mr. Hill seriously mean to assert that “a large pitch propeller will not develop as much power as a smaller pitch propeller?” If so, why are so many designers of full-sized machines fitting geared-down propellers, with much better results than formerly?

I quite agree with Mr. Hill that, unless checked in the interests of the safety of the unoffending general public, “the flying-stick of the future (as of the present) will be large propellered and fitted with enormous skeins of elastic,” but of course it will not be an aero-model, but merely a flying-stick.

Perhaps Mr. Hill is prepared to show me a half-mile flight with

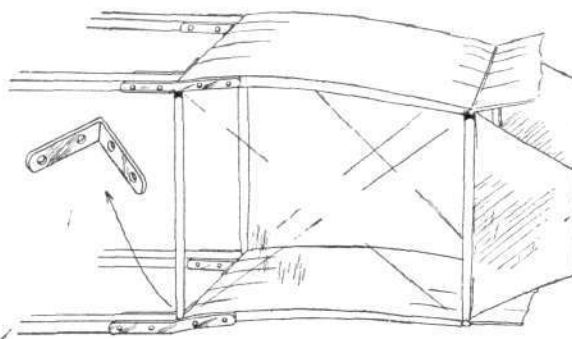
his power-driven scale model. In the meantime I am inclined to the view that “there is nothing like rubber!”

Surbiton.

R. F. MANN.

Tail Mounting.

[1386] Replying to letter 1086, the enclosed sketch shows the



method of mounting a biplane tail by brackets made from strip aluminium $\frac{1}{8}$ in. thick by $\frac{3}{16}$ in. wide.

Oldham.

B. S. HIRST.

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